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REPORT
OF
HARBOR AND LAND
COMMISSIONERS


1910

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THIRTY-SECOND ANNUAL REPORT

OF THE

BOARD OF HARBOR AND LAND
COMMISSIONERS.

FOR THE YEAR 1910.

Compliments of

GEORGE E. SMITH,
SAMUEL M. MANSFIELD,
HEMAN A. HARDING,

Harbor and Land Commissioners.

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The Commonwealth of Massachusetts.

REPORT.

To the Honorable the Senate and House of Representatives of the Commonwealth of Massachusetts.

The Board of Harbor and Land Commissioners, pursuant to the provisions of law, respectfully submits its annual report for the year 1910, covering a period of twelve months, from Nov. 30, 1909, being the thirty-second annual report of the Board since its establishment by chapter 263 of the Acts of 1879.

The present organization of the Board is as follows: George E. Smith of Swampscott, chairman, Samuel M. Mansfield of Boston, Heman A. Harding of Chatham.

From Dec. 1, 1909, to Nov. 30, 1910, the Board has given 266 formal and informal hearings, and has received 206 petitions for licenses to build and maintain structures and for privileges in tide waters, great ponds and Connecticut River, to dredge material, to remove material from beaches, and for other purposes.

One hundred and eighteen licenses for structures and privileges in tide waters, great ponds and Connecticut River have been granted during the year; also 62 permits for dredging, for the removal of material from beaches, and for other purposes.

Inspections have been made at various times, by and under the direction of the Board, of work completed and in progress; of sites of authorized work, under appropriations made by the Legislature; also upon petitions and plans presented of the sites of proposed work in tide waters; various structures built under

licenses; sites of alleged dumping of material into tide waters; Connecticut River; great ponds; State boundary lines; town boundary survey work.

Through transactions of the Board there has been paid into the treasury of the Commonwealth during the year from rents, licenses, leases and other sources, and credited to the Commonwealth's flats improvement fund and the harbor compensation fund for Boston harbor, the aggregate sum of \$55,498.01. This does not include income from investments of the funds.

During the year 19 contracts were made, involving the estimated expenditure of \$1,024,415.86. A list of these contracts and those pending, with details relating thereto, may be found in the Appendix.

BOSTON HARBOR.

Under appropriations made by Congress, the main ship channel has been dredged from the Navy Yard at Charlestown and the Chelsea and Charles River bridges to President Roads, to a width of 540 feet, and from President Roads through Broad Sound to the ocean, to a width of 675 feet, through which a general depth of 35 feet at mean low water exists; but the channel from the Navy Yard to President Roads is obstructed by a few small shoals not yet removed. When fully completed, which it is expected will be about Dec. 31, 1911, the full widths of these channels will be 1,200 feet and 1,500 feet respectively, obstructed only by ledges in process of removal. At high water there will be an increase in this depth of 35 feet, varying from 9½ to 12 feet, offering ample depth for the largest ships.

The Commonwealth has for many years pursued a well-defined policy of harbor conservation and improvement, and has made liberal appropriations to supplement the work done by the United States government, particularly for dredging, at a cost of about \$500,000, an anchorage basin near Bird Island flats to a depth of 30 feet at mean low water over an area of about 126 acres. The areas lying between the main ship channel and the various wharves and piers have also been dredged to depths which enable vessels to more easily reach the wharves and docks.

The Commonwealth has not only improved the harbor by dredging, but has reclaimed and partly developed a large area at South Boston, has acquired for commercial uses another large territory at East Boston, not yet developed, and has constructed piers and docks for the commercial advancement of the port.

In view of the extended discussions during the year of matters relating to this harbor and the possible increase of terminals for the benefit of the port and the State, a statement is herein presented in relation to the Commonwealth's land and flats at South Boston and East Boston, the present conditions pertaining to the various railroad and steamship piers and docks, and a plan for a system of piers and docks at East Boston.

The Commonwealth's Land and Flats at South Boston.

The improvement of this territory, actively commenced by the State in 1873, was undertaken primarily as a harbor improvement and health measure, and the project for development included the dredging of portions of the upper harbor and the use of the dredged material for filling these flats.

Many plans of this property have been prepared by this Board and various other boards and committees who have had it in charge, and on a number of these plans a system of piers and docks was shown. Even as far back as 1866 a plan was approved and adopted by the Legislature, and in the Resolves of that year, chapter 81, the commissioners were directed to report the cost of building certain structures and of dredging and filling, and in all plans submitted to always regard the protection and improvement of Boston harbor as of paramount importance in any intended occupation of these flats.

The land covered by a portion of the present terminal of the New York, New Haven & Hartford Railroad Company on the harbor frontage and at the mouth of Fort Point Channel in South Boston was owned up to 1880 by the Commonwealth, and a portion of the piers and docks thereon were built by the State in furtherance of plans sanctioned by the Legislature. These docks vary in length from 770 feet to 1,050 feet, and have a depth of from 26 to 32 feet at mean low water.

Commonwealth Pier.

This pier, 1,200 feet long and covering about 11 acres, was completed in 1901. There is a depth of 30 feet at mean low water in the west dock and 35 feet in the east dock and end berth.

On Oct. 22, 1909, a contract was entered into with the Eastern Dredging Company to dredge to the depth of 35 feet at mean low water the dock on the easterly side of this pier, and an area opposite said pier and dock and lying between the pierhead line and the channel dredged by the United States government; the areas to be dredged being 1,150 feet long and 150 feet wide in the dock, and about 500 feet long and 600 feet wide outside the pierhead line. The contract price was 15 $\frac{3}{10}$ cents per cubic yard, measured in scows. This work is nearly completed, the cost to Dec. 1, 1910, being \$70,025.50, to be paid from the Commonwealth's flats improvement fund.

On Nov. 1, 1910, this pier and the two adjoining docks, together with 597,177 square feet of land lying between Summer Street and Northern Avenue, was leased to the Old Colony Railroad Company for a term of thirty years, beginning Dec. 1, 1910, the rental being at the rate of \$70,000 per annum, the lessee to pay to the city of Boston the taxes on the leased premises. The area covered by this lease is shown on the plan accompanying this report.

What the plans of the New Haven management may be for the use of this pier and for the future use of others at its South Boston terminal are not yet disclosed.

Fish Industry.

In September, 1909, representatives of the wholesale fish trade of Boston opened negotiations with the Board, with a view to leasing the Commonwealth Pier as a location for the carrying on of the very important fish industry at this port, now located at T wharf.

This pier, although larger in area and affording somewhat deeper water in the westerly dock than the demands of this industry required, appeared to the fish dealers to be well located for their purposes. After various conferences it was finally

concluded that if a new pier is built by the State next easterly of the Commonwealth Pier, of a length equal to that pier and 300 feet wide instead of 400 feet, with a depth of 23 feet at mean low water in the docks and approaches, it and two parcels of land adjoining the southwesterly side of Northern Avenue, containing 177,100 square feet, could be used to advantage; and, with connection by rail between the pier and the tracks of the New York, New Haven & Hartford Railroad Company, would afford the necessary facilities for shipment; and that a lease of the pier and land would be taken by a corporation to be organized.

Accordingly, an agreement between the Commonwealth and the Boston Fish Market Corporation was prepared and executed, and approved by the Governor and Council, providing for the construction by the Commonwealth of a pier, 1,200 feet long and 300 feet wide, extending from Northern Avenue to the United States pier and bulkhead line, consisting of earth filling enclosed by masonry walls, together with docks on the northwesterly and southeasterly sides of said pier dredged to a depth of 23 feet at mean low water; and further providing for the dredging of an area of approach 850 feet wide opposite the premises to be leased, and extending from the pierhead line to the main ship channel; the dredging to a depth of 19 feet at mean low water of any shoals to the east which may be found to interfere with vessels reasonably making their berth; the paving of the surface of the pier, and subsequently the relaying of the paving; the building and paving of a street 100 feet wide extending the length of the pier and connecting with Northern Avenue, the corporation to have an opportunity to lay railroad tracks concurrently with the construction of this street; the filling to the grade of Northern Avenue of the land on the southwesterly side of said avenue included in the premises leased; the construction and extension of Northern Avenue across the line of the leased premises to the southeasterly side line thereof extended; the extension of D street from Summer street to Northern Avenue; the construction of drains; the running of two lines of sewers the length of the pier to Northern Avenue as extended; a right of way across land of the Commonwealth for certain sewer connections; the completion of said

pier and Northern Avenue by Aug. 1, 1913, except for the relaying of the pavement, which is to be done within five years thereafter, provided that the work shall be so far advanced by July 1, 1912, that the construction of buildings to be erected on said pier by the corporation may be commenced.

This agreement provided that said corporation would, prior to Oct. 1, 1913, erect buildings of concrete or brick, or other substantial construction, on the leased premises, and make other improvements, costing not less than \$400,000, unless it should be agreed that the expenditure of a part of this sum may be postponed beyond said date; that said corporation would deposit with certain trust companies, as security for the performance by it of the agreement, \$400,000, in installments at certain times, with the right in said corporation to draw on these funds for the erection of buildings and for other structures and improvements on the leased premises, as the work progresses, such drafts to be approved in writing by this Board.

This agreement further provided that if said corporation desired to occupy the leased premises as a tenant subsequent to June 1, 1912, and prior to Oct. 1, 1913, the date of the commencement of the lease, it might do so, paying the same rental as prescribed in the lease, said tenancy to continue up to the time of the commencement of the lease.

A further provision of this agreement was the execution, concurrently with the execution of this agreement, of a lease between the parties, the same to be delivered in escrow, and to take effect and to be turned over to the Commonwealth and said corporation, upon the performance of the conditions of the agreement, exclusive of the postponed work of repaving.

Plans and specifications for the pier and Northern Avenue extension described in the agreement were prepared, providing for the building of a heavy sea wall to enclose the area to be filled, consisting of granite blocks resting on a bed of granite quarry chips with a ballast backing, a trench for this wall to be excavated to a depth of about 28 feet below mean low water; the width of this wall at the bottom to be 27 feet, at the top 4 feet, its height to be 41 feet and its total length 2,700 feet.

The plans also covered the construction of a light sea wall,

645 feet in length, along the northeasterly side of Northern Avenue, to be built of granite quarry stone on a pile foundation, and the dredging and other work required by the agreement aforesaid, the specifications requiring the work to be completed not later than Jan. 1, 1913.

This work was advertised, and on Sept. 2, 1910, the Board received eleven proposals, the highest being \$1,445,200 and the lowest \$760,000. The contract was awarded to the Holbrook, Cabot & Rollins Corporation of Boston, Mass., the lowest bidder, and the work is now in progress.

The lease, as executed by the parties, and approved by the Governor and Council Sept. 28, 1910, is for a term of fifteen years, beginning Oct. 1, 1913, the annual rental being \$35,000, with the right in the lessee to extend the lease for a further period of fifteen years from Oct. 1, 1928, on the same terms and conditions, except that the annual rental for the additional term of fifteen years shall be at the rate of \$45,000, the lessee during the term of the lease or extension thereof to pay the annual taxes, meaning the annually recurring municipal tax.

The provisions of the lease, other than those relating to the pier, dredging and extension of Northern Avenue, are in general that the lessee may extend a breakwater along the easterly side of the leased flats, with a lateral spur; may erect an additional pier, together with lateral spurs therefrom and from the pier to be built by the lessor, and may make other improvements and erect buildings and other structures on the leased premises; that all buildings, piers and any breakwater which may be erected by the lessee shall attach to the realty, and the title thereof shall accrue to the lessor at the expiration of the term of the lease, or, if the term is extended, then at the expiration of any extension or extensions thereof; that the lessee may make additions to or alterations in buildings and structures, and may remove during the period of the lease any of said buildings or structures, provided they are removed in good faith by it to facilitate the advantageous use of the leased premises; that all other structures and buildings and all machinery and equipment remain the property of the lessee, and may be removed by it at the expiration of the lease or any extension or exten-

sions thereof, and shall be removed by it if so required by the lessor; that all buildings and structures which extend into the flats across the end of the docks northeasterly from Northern Avenue, except the breakwater and except piers with the buildings thereon, shall be removed by the lessee at the expiration of the lease or any extension or extensions thereof, if such removal is required by the lessor.

The area covered by this lease is shown on the plan accompanying this report.

Leases and Rentals.

On Sept. 30, 1910, an agreement was entered into between the Commonwealth and the Metropolitan Coal Company, fixing the rental to be paid to the Commonwealth by said company during the period of nine years covered by an extension dated May 10, 1906, of the lease of certain land and a pier on the State's property, as follows: from April 1, 1912, for a period of four years thereafter, at the rate of \$10,000 per annum; and from April 1, 1916, for a period of five years thereafter, at the rate of \$12,000 per annum.

The sum of \$511.94 has been paid by various parties during the year for the use of the dock on the westerly side of the Commonwealth Pier and for other privileges connected therewith. The United States vessels used by the Massachusetts Naval Brigade have been permitted to occupy this dock for mooring purposes at different times, as well as the revenue cutter "Gresham," without charge.

No sales of the lands at South Boston have been made during the year.

The pile wharf on the northerly side of the Reserved Channel, 300 feet long and 50 feet wide, included in the lease from the Commonwealth to the Grasselli Chemical Company of Massachusetts, dated Aug. 24, 1909, which was under construction at the date of the last report, was completed March 18, 1910, at a cost of \$10,101.

Other piers have been built in the past, on the Reserved Channel and the main harbor frontage, and are now used in connection with land leased by the Commonwealth.



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Future Development.

As has often been shown, there is a very large part of this territory at South Boston available for further development as a water and railroad terminal. Upon the main harbor frontage a series of 11 large piers, with docks varying from 900 to 1,200 feet in length, and smaller piers and docks on the Reserved Channel, can be built and dredged whenever the demands of business require, and they can be connected with the New York, New Haven & Hartford Railroad, and, at reasonable expense, with the other railroads entering Boston.

A plan of the State's property at South Boston, and surrounding territory, accompanies this report, and shows a possible extension of the present pier and dock system.

The Commonwealth's Flats at East Boston.

In 1898 this Board purchased and made a taking of land and flats near Jeffries Point in East Boston, under authority of chapter 486 of the Acts of 1897, for the purpose of securing public ownership and control of that part of the foreshore of Boston harbor, the area purchased and taken being about 100 acres. The appropriation under the act was \$100,000, of which sum \$35,084.27 has been expended to Dec. 1, 1910, for land and for incidental expenses connected with the purchase and taking of the same.

At the time that this territory was acquired, the Board adopted a general scheme or plan of development to be carried out by it under the authority of the said act of 1897. In its report for 1898 the Board stated that "the Commonwealth has by this taking dedicated another section of the harbor front to the use of maritime commerce, and has confirmed the policy of encouraging the growth of this port by taking measures to meet growing demands for enlarged accommodation, while preserving conditions which will operate against increase of cost in supplying facilities for handling cargoes in process of transportation or for local delivery. In order that this acquisition may realize the greatest possible benefit to the public, it will be necessary for the railroads with freight terminals in

East Boston to relocate their tracks on the east side of the island, as was advocated in the report of the State Board on Docks and Terminal Facilities in 1896, and by the mayor of Boston in 1897. By so doing, a short, cheap and easy rail connection can be made to the piers and docks to be established on the newly acquired territory by the group of railroads having terminals on the north side of the harbor."

The Board also recommended in 1898 additional legislation in order that further provisions of the statute of 1897 aforesaid might be carried out. In 1899 the Board expressed its belief that all the water front available for the approach of transatlantic steamships and at the same time accessible to the railroads would be wanted soon, and therefore plans should be carefully matured, ready for development whenever the Legislature should make an appropriation therefor. Several studies for improvement were considered at this time, including deep channel approaches.

In 1900 the Board stated that "until plans shall be definitely matured by the railroad company with reference to the relocation of its tracks in East Boston, it would be premature to formulate plans for the development of the East Boston flats of the Commonwealth."

In 1904 the Commission on the Separation of Grade Crossings at East Boston reported in favor of the plan of the Boston & Albany Railroad Company, which permitted its tracks to remain substantially in the location heretofore occupied through the center of the island; and as a result the flats taken by the Commonwealth failed to receive the benefit which a relocation of the tracks would have given.

In September, 1909, a suit, which has been pending for a number of years, in relation to the title of certain flats in this locality, was decided in favor of the Commonwealth. There now remains, however, to be determined by the court, the value of an area of flats taken in 1898, which the Commonwealth always supposed to be the property of the party claiming them at the time of the taking.

From the foregoing statement it will be seen that the Board from the date of acquisition of this territory has by recommendations to the Legislature, and efforts to induce a change

in the location of railroad tracks, and otherwise, endeavored to improve this property and the channels extending thereto from the main ship channel, for commercial uses, but has been hampered by litigation and existing railroad conditions.

During the year the Legislature, in pursuance of the policy of the public ownership and control of this portion of the fore-shore of the harbor, passed an act — chapter 648 of the Acts of 1910 — which authorizes the Board of Harbor and Land Commissioners to purchase, take or otherwise acquire certain land and flats on the easterly side of East Boston, for the purpose of securing access to the land and flats of the Commonwealth; such land and flats or any rights therein as may be necessary for railroad tracks and traffic roads; to exchange land or flats now owned or hereafter to be acquired by the Commonwealth for other land or flats or rights therein now owned by other persons or corporations; to fill portions of the flats of the Commonwealth, and build one or more wharves on the land, flats or rights therein now owned or hereafter acquired by the Commonwealth; and to do such dredging as may be necessary to secure suitable access to such piers or wharves. “whenever satisfactory contracts are made with the Commonwealth for the use of such railroad right of way, filled flats or pier or wharf at a rental, for a term and upon provisions, restrictions and obligations which are deemed reasonable and in the public interest by said Board, and approved by the Governor and Council, or when a satisfactory and reasonable contract as aforesaid is made for the use of such rights of way, lands or flats without such grading, surfacing, filling or building.” This act further provides that before exercising the powers conferred thereby this Board shall obtain from the city of Boston a conveyance of all its present right, title and interest in Apple Island and the flats appurtenant thereto, or any other flats and rights of said city on the easterly side of East Boston which in the opinion of this Board are required for the development hereunder, without expense to the Commonwealth therefor. This act provides further for the issue of bonds to the amount of \$3,000,000 to meet the expenses incurred under the act.

Legislation in furtherance of commercial development in this portion of the harbor is contained in chapter 623 of the Acts

of 1910, which changes and advances the harbor line at and near Jeffries Point.

During the year the Board, acting under the provisions of chapter 648 aforesaid, has forwarded to the mayor of Boston a letter on the subject of the acquisition of the flats and rights owned by the city of Boston, but thus far the matter has not been determined.

Ownership and Control of Certain Piers and Docks.

The New York, New Haven & Hartford Railroad Company and the New York Central & Hudson River Railroad Company either own or control most of the piers and docks in Boston harbor used by the regular foreign steamship lines, these piers and docks being located at South Boston, at the mouth of Charles River in Charlestown, at the junction of Mystic River and the harbor at Charlestown, and at East Boston near Jeffries Point not far from the Commonwealth's land and flats. The maximum and minimum lengths of the docks at the terminal of the New York, New Haven & Hartford Railroad Company at South Boston have been given herein. The length of the piers and docks at the mouth of Charles River in Charlestown, known as the Hoosac Tunnel Docks, is now inadequate for use by the steamships which berth there. It would not be possible for the large White Star steamers now under construction, or even the largest steamships of this line now sailing from New York, to use them without projecting considerably beyond the pierhead line. The piers and docks at Mystic wharf, so called, located both above and below Chelsea bridge, are now used to a very large extent.

The piers and docks at East Boston owned or controlled by the New York Central & Hudson River Railroad Company are fully used, and an additional pier about 834 feet in length is now under construction, the depth of the docks to be 35 feet at mean low water.

In respect to lengths of piers and docks, it may be noted that new and larger steamships are under construction or in contemplation, which could not be berthed in New York, where there are at present no piers equal in length to these ships. The new Chelsea piers on Manhattan Island are only 800 feet

in length, and cannot be lengthened. These large ships can, however, be berthed in Boston at the Commonwealth Pier.

Reference is here made to the report of this Board for the year 1907 and plans therewith, containing statistics of the port and compilations in respect to terminals, ownership, piers and docks, harbor channels, etc.

Plan for Piers and Docks at East Boston.

A plan of the shore and flats on the easterly side of East Boston, showing a possible development of that area for a water front and railroad terminal, accompanies this report.

This plan does not contemplate the building of the proposed pier heads on the State harbor line of 1910. The object in locating the pier heads near Jeffries Point as shown is to preserve the present channel opposite the Simpson's dry docks and the present piers at the Point, thereby permitting the private owners to continue to use the present piers, and obviate for a time the necessity for dredging Bird Island flats, as required by the War Department in its approval of Sept. 27, 1910, provided the piers should be extended to the harbor line of 1910.

Beginning with the pier numbered "4" on the plan appended hereto, the new piers would be built upon flats owned by the Commonwealth, and could hereafter be extended to the new harbor line of 1910. The Governors Island channel from President Roads would be dredged to connect with the main ship channel, and would be fully adequate to accommodate ships using the proposed piers. At a later date, if additional facilities for navigation should be required, the remaining area of Bird Island flats could be dredged, the anchorage basin enlarged and the Jeffries Point piers then extended to the harbor line of 1910 by license of the Commonwealth, on payment of a reasonable proportion of the cost of the dredging.

If the Boston, Revere Beach & Lynn Railroad is taken over by the New Haven road, as petitioned for, its tracks at grade would be eliminated, and a feasible and inexpensive connection could then be made between the present Grand Junction terminal at East Boston and the new piers shown on the plan. Convenient connection by rail could also be made over the flats of the East Boston Company between the proposed piers and

both the Grand Junction Railroad and the Boston & Maine Railroad location at East Boston, as shown on the plan.

The development substantially as outlined on the accompanying plan was suggested by this Board as far back as 1880. It was considered more in detail and was approved by the Metropolitan Improvement Commission in its report to the Legislature in 1909. It has been recommended by eminent engineers, and has received favorable consideration by the Quadruple Board appointed to make an investigation relative to public improvements for the Metropolitan District, which will report to the Legislature early in January, 1911.

A great opportunity awaits the growing demands of commerce at this port. The Commonwealth should keep a firm grip on the situation. It owns the flats sufficient in area for a beginning. The city of Boston and the United States own other flats, which are shown on the plan, and both will beyond question gladly contribute their flats at the proper time, in order to further the demands of a great terminal at this port.

The 2,000 acres shown should be devoted to a steamship and railroad terminal, and held by the Commonwealth for the demands of the future.

The reclamation of the flats in this location is not a land speculation. It is for a great terminal. No plausible appeals should induce the Commonwealth ever to part with its title, or to so far part with its control that any railroad could be kept out of the track yard, or any steamship be forbidden to berth at these piers. Low and uniform switching and dockage charges should be maintained, and no profits expected or permitted. When the demand arises, expense should not be spared.

The building of piers 1,200 feet long with 35 feet of water in the berths does not necessarily bring large steamships to the port. There are now unused piers at this port. Steamships will come here if there are passengers and cargoes. The citizens of Boston must develop the business, the manufacturing and the commerce of Boston, Massachusetts and New England. There is a growing interest manifested.

The Commonwealth should develop a great terminal, at which the railroad and steamship lines may come and make their exchanges.

Note: Soundings are in feet and refer to mean low water



The Commonwealth has already taken a most important step looking toward this end. As has been previously noted, chapter 648 of the Acts of 1910, section 6, places at the disposal of this Board \$3,000,000, to be used in building piers and in filling and developing these flats, when tenants appear, ready to enter into contracts which the Governor and Council may approve.

The filling of flats and the building of piers consume much time. In this location the filling of the flats will require more time than the building of the piers; and without such filling of the flats, piers cannot be used.

To further advance the development of this area as a great terminal, to bring its condition forward to a point where, should a tenant appear, rendering chapter 648 of the Acts of 1910 operative, the actual building of a pier or piers can be done with the least delay and expense, the Board makes the recommendation that it be authorized to construct a bulkhead and fill a suitable portion or portions of these flats, and that an appropriation be made therefor.

MYSTIC RIVER, SOUTH CHANNEL.

In March, 1910, a survey was made, and an estimate of cost prepared for the improvement of the south channel of Mystic River from deep water in the harbor to a point above Chelsea ridge, south, to enable vessels to pass to and from the several harves at all ordinary tides.

On July 1, 1910, a contract was entered into with the Easton Dredging Company, to dredge to the depth of 20 feet at mean low water a portion of the south channel of this river below and above Chelsea bridge, south, the portion below this bridge being about 950 feet long and 85 feet wide, and that above the bridge 1,850 feet long and 110 feet wide. The amount of material to be removed was estimated to be about 115,000 cubic yards, scow measurement, and the contract price $14\frac{3}{10}$ cents per cubic yard, measured in scows.

This work is now substantially completed.

While the above work was in progress, a request was received that a shoal middle ground, located between the portion of the

channel being dredged and the wharves on the south side of the river, be removed. After an examination a contract was entered into on Nov. 18, 1910, with the Bay State Dredging Company, to dredge to the depth of 20 feet at mean low water an area of about 88,800 square feet in this river, above Chelsea bridge, south. The amount of material to be removed is estimated to be about 43,000 cubic yards, scow measurement, and the contract price 18 cents per cubic yard, measured in scows.

The improvement of this river under the above contracts is to be paid for from the income of the harbor compensation fund for Boston harbor.

The amount expended during the year is \$11,869.36, which is also the total amount expended on the south channel of this river to Dec. 1, 1910.

ORIENT HEIGHTS.

The dredging of a channel in Boston harbor from the pier of the Orient Heights yacht club at East Boston, about 2,700 feet long, 30 feet wide on the bottom and 5 feet deep at mean low water, under a contract between the Commonwealth and J. P. O'Riorden, dated July 14, 1909, was substantially completed in September, 1909; but a portion of the excavated material had been dumped on the South Boston flats during bad weather, when it was impossible to tow the loaded scows to sea, with the understanding that this material should be redredged and taken to the prescribed dumping ground at a later date. This requirement was complied with and the work completed on May 18, 1910.

The total cost of this improvement, including supervision and incidental expenses, was \$8,144.52.

Appropriations: —

Chapter 109, Resolves of 1907,	\$1,500
Chapter 134, Resolves of 1909,	7,000
<hr/>	
Total,	\$8,500

The amount expended during the year is \$2,808.

The total amount expended to Dec. 1, 1910, is \$8,144.52.

THE IMPROVEMENT AND PROTECTION OF RIVERS, HARBORS,
TIDE WATERS AND FORESHORES.

By chapter 481 of the Acts of the year 1909 the Board is authorized and directed to undertake such work for the improvement, development, maintenance and protection of rivers, harbors, tide waters and foreshores within the Commonwealth as it may deem to be reasonable and proper, and may expend during the years 1910, 1911 and 1912 a sum not exceeding \$300,000, not more than \$100,000 to be expended in any one year.

This act also provided that the Board shall consider the general public advantage of the proposed work, the local interest therein as manifested by municipal or other contributions therefor, the importance of the industrial or commercial and other interests to be especially served thereby, and any other material considerations affecting the feasibility, necessity or advantage of the proposed work or the expenditure therefor. It was further provided that no work shall be commenced until after a public hearing has been held and a survey and estimate of cost has been made; that a city or town might appropriate money for the improvement of rivers, harbors, tide waters and foreshores within its jurisdiction, the money so appropriated to be paid into the State treasury, to be expended by the Board for said purposes; and that the city or town might assume liability for all damages to property suffered by any person by any taking of land, or of any right, interest or easement in land within the city or town made by the Board for the purposes authorized by the act.

Petitions to the number of 39 have been presented for improvements in the following localities, and public hearings held thereon: Allens Harbor, in Harwich; Annisquam River, in Gloucester; Bass River, in Yarmouth and Dennis; Bucks Creek, in Chatham; Centreville River, in Barnstable; Chatham; Cohasset Harbor; Connecticut River, at Hadley and near Mt. Tom junction; Cotuit Harbor, in Barnstable; Deacon's Pond, in Falmouth; Dorchester Bay between Savin Hill and Commercial Point; Hull; Ipswich River; Lake Anthony, in Oak Bluffs; Lobster Cove, in Gloucester; Manchester Harbor;

Marshfield; Menamsha Inlet, in Gay Head and Chilmark; Mill River, in Gloucester; Mitchells River, in Chatham; Old Harbor; Paskamansett River, in Dartmouth; Quincy; Rock Harbor, in Orleans; Rockport Harbor; Scituate; Scorton Harbor, in Sandwich; Sesuit Harbor, in Dennis; Sippican Harbor, in Marion; Swampscott Bay; Taunton River; West Chop, in Tisbury; Wild Harbor, in Falmouth; Witchmere Harbor, in Harwich; Woods Hole.

Of the foregoing petitions, nine have been favorably acted upon, as appears later, in detail, in this report.

The petitioners for protective work at Hull; for repair of walls at Brant Rock and Green Harbor, in Marshfield; for repair of walls and for protective work in Scituate; for removal of rocks in Sippican Harbor, at Marion; for protective work at the bluff at West Chop, in Tisbury; for improvement of the waterway between Eel Pond and Great Harbor, at Woods Hole, were severally granted leave to withdraw.

The remaining petitions have been considered, and are now pending.

BUCKS CREEK, CHATHAM.

Petition of the board of selectmen of Chatham, and others, for further improvement of Bucks Creek in the town of Chatham, presented to the Board Feb. 23, 1910.

This creek is the outlet of Taylors Pond, in the southwesterly part of Chatham, and its outlet is used as a harbor by a fleet of fishing boats, which are principally engaged during the winter in gathering scallops.

In 1909 the Board, acting under authority of chapter 120 of the Resolves of that year, reported two projects of improvement which contemplated extending the jetty built by the Commonwealth in 1904-05, building a jetty about 200 feet long parallel with the westerly jetty and about 100 feet distant from it, and excavating a channel through the beach between the jetties and closing the existing outlet by a sand dike. Two estimates of cost of this project were made in 1909, which differed only in the amount of excavation proposed, as follows: Project No. 1, \$10,500; Project No. 2, \$16,000. A survey and re-examination of this locality was made in March, 1910, and the selectmen of Chatham were informed that the Board was pre-

pared to proceed and make the desired improvement described in Project No. 1, at an estimated cost of \$10,500, provided a contribution was made towards the cost of the work of not less than \$1,000.

The town of Chatham appropriated \$640, and an additional amount of \$360 was contributed by private parties in aid of this project.

On May 20, 1910, a contract was entered into with James H. Connolly of Hyannis, Mass., to build two stone jetties, to excavate the channel between the jetties to the level of mean low water, and to construct a dike across the present channel near the inner end of the easterly jetty, the channel between the jetties to be about 200 feet long, excavated 70 feet wide on the bottom, at the plane of mean low water; the banks to be protected by stone riprap; the dike to be about 400 feet long and 20 feet wide at the top. The contract prices are \$2,600 for excavating the channel and building the earth portion of the dike, and \$2.35 per ton for furnishing and placing stone in the jetties and riprap.

Work is now in progress.

The amount expended during the year is \$2,797.67.

The total amount expended at Bucks Creek to Dec. 1, 1910, is \$3,988.02.

CENTREVILLE RIVER.

Petition of Chester Bearse and others for an opening through the beach opposite Bumps River, between Centreville and Osterville, in the town of Barnstable, presented to the Board Feb. 14, 1910.

Bumps River is a small stream flowing into Centreville River, the latter flowing into East Bay which has been improved under appropriations made by the Legislature. In considering this petition, after a survey and examination of the locality had been made, it appeared that a project providing for the dredging of Centreville River, instead of cutting an opening through the beach, as petitioned for, would be of greater value for boating, would make a safe and convenient harbor for the villages of Centreville and Craigville and adjacent territory, and improve the oyster, clam and quahaug fisheries in this river.

An estimate of cost of the necessary dredging was made and a contribution of \$1,500 was made by private parties in aid of this project, to be expended under direction of the Board, in addition to an allotment from the general appropriation.

On Sept. 28, 1910, a contract was entered into with John H. Gerrish, to dredge to the depth of 5 feet at mean low water a channel 75 feet wide on the bottom and about 2,350 feet long, from the inner end of the channel dredged by the Commonwealth in 1908 and 1909 in East Bay, through Centerville River to a point about 200 feet southwesterly from the bridge of Thomas Gaff over said river. The amount of material to be removed is estimated to be about 24,000 cubic yards, and the contract price is \$7,200 for dredging and for depositing the material on the beach between the dredged channel and Nantucket Sound.

Work is now in progress.

The amount expended during the year is \$2,294.70.

COHASSET HARBOR.

Petition of Louis I. Goodwin and others, a committee appointed by the Harbor Improvement Committee of Cohasset, for a breakwater on or near Bassing Beach, in the town of Cohasset, presented to the Board Jan. 28, 1910.

In March, April and May, 1910, a survey was made including the whole harbor and showing Bassing Beach and Baileys and Wood islands. A project for improvement was prepared, with estimate of cost, comprising the construction of a stone breakwater extending northeasterly from Bassing Beach, to protect the inner harbor from northeasterly storms, and the dredging of a channel and anchorage basin to the depth of 6 feet at mean low water. The town of Cohasset appropriated \$5,000, and an additional \$7,000 was contributed by private parties in aid of this project.

On July 18, 1910, a contract was entered into with Thomas Fitzgibbon of Beverly, Mass., for the construction of a stone breakwater at the entrance to the inner harbor, extending from a point on Bassing Beach about 1,200 feet northeasterly from its southwesterly end and to extend therefrom about 800 feet northwesterly. The contract price was \$2.13 per ton for fur-

nishing the stone and building the breakwater. This work is well advanced, but it will not be completed before the end of this year.

Another contract was entered into on July 18, 1910, with Jeremiah P. O'Riorden, for dredging an anchorage basin and channel leading therefrom to the town landing, in the inner portion of the harbor, the basin to be made by dredging to the depth of 6 feet at mean low water an area of flats about 1,100 feet long and 300 feet wide, lying northwesterly of the present channel and extending from a bend in the present channel about opposite the Cohasset Yacht Club house to the present anchorage basin. The channel leading to the town landing to be dredged 4 feet deep at mean low water, 100 feet wide on the bottom, and to be about 700 feet long.

The contract price is $14\frac{5}{8}$ cents per cubic yard, measured in scows.

Inasmuch as the contract price was much less than the estimated cost of the dredging, two adjoining areas are now being dredged in addition to the area described in the contract, without, however, exceeding the original allotment from the general appropriation.

The amount expended during the year is \$21,191.76.

CONNECTICUT RIVER.

Petition of the board of selectmen of the town of Hadley, and others, for further protective work on the Connecticut River at Hadley, presented to the Board Jan. 24, 1910.

By chapter 344 of the Acts of 1885 this Board was given the general care and supervision of the Connecticut River and its banks and of all structures therein, to prevent and remove unauthorized encroachments and causes of every kind which may in any way injure the river, and to protect and develop the rights and property of the public therein.

The appropriations for work on this river from 1888 to 1909, inclusive, amounted to \$115,500. The total amount expended at Hadley to Dec. 1, 1909, was \$70,816.72.

After consideration of this petition an examination was made of that section of the river bank between the north ends of Middle Street and West Street which was covered with stone riprap

in 1888-89, under appropriations made by the Legislature. It appeared that the current had cut under the work done in previous years to a certain extent, and that the undermining had progressed so far that the upper portion of the bank was being cut out. An estimate of cost having been prepared, it was concluded to place stone riprap on the slope of the bank from the deepest thread of the river up to the summer water line, and to grade and riprap a few small areas of the upper portion of the slope.

On Aug. 16, 1910, a contract was entered into with Florus W. Carrier, to furnish and deposit in place about 2,000 tons of riprap stone on the river bank at Hadley, the same to be deposited as directed by the engineer. The contract price was \$2.25 per ton for stone delivered and placed. All work under contract was completed on Nov. 3, 1910, stone to the amount of 3,387.1 tons having been used, as it was found necessary to protect a larger area of slope than was at first estimated. The total cost, including grading, supervision and incidental expenses, was \$7,984.82.

A contribution of \$500 was made by the town of Hadley in aid of this project.

The bank now appears to be thoroughly protected over the whole length which was ripped in 1888-89. Above this is a section which was protected by brush mats and riprap in 1900-09. At the present time this appears to be in good condition, but it may, in the future, require some additional stone on the lower portion of the slope.

The amount expended during the year is \$7,005.72.

The total amount expended at Hadley to Dec. 1, 1910, is \$77,822.44.

COTUIT HARBOR.

Petition of Wm. H. Irwin and others, for improvement of the entrance to Cotuit harbor, presented to Board Feb. 2, 1910.

Appropriations for this harbor amounting to \$20,000 were made in 1904, 1908 and 1909, chapter 124 of the Resolves of 1909 authorizing the expenditure of \$10,000, in addition to \$5,000 previously appropriated. The total amount expended to Dec. 1, 1909, was \$2,647.45. The resolve of 1909 directed the Board to make the improvement in such manner as it might deem best. Surveys were made and estimates of cost of several

projects prepared, but up to the presentation of the foregoing petition no conclusion had been reached as to the best method of improving the harbor entrance.

After consideration of this petition, two projects for improvement were prepared: one providing for the building of a stone jetty extending from Sampson's Island on the east and a jetty from Popponessett Beach on the west side of the entrance, the two jetties converging and forming an entrance which it was expected would so increase the velocity of the tidal currents that they would scour out the channel about midway between Gull Island and Sampson's Island; the other project providing for the dredging of a channel 6 feet deep at mean low water and 200 feet wide, in the same locality which it was proposed to scour out by the construction of the jetties. It was estimated that the cost of the jetties would be much greater than the cost of dredging direct, and that the cost of either project would exceed the balance of the appropriation. It was finally concluded to expend the balance of the appropriation, together with an allotment from the general appropriation and a contribution of \$2,000 made by private parties, for dredging, as the Board was of the opinion that if the dredging was done the channel would probably maintain itself for a number of years, that it would be the most quickly available, and would undoubtedly give the best results. Accordingly, a contract was entered into on July 25, 1910, with the Bay State Dredging Company, to dredge the channel across the bars at the entrance to the harbor so that it shall be 200 feet wide on the bottom and not less than 6 feet deep at mean low water, the entrance channel being in two sections, the inner section being about 700 feet long and the outer one about 3,000 feet, the basin between the two sections being about 1,000 feet across, with a depth of 6 to 10 feet at mean low water. The contract price is \$22,500, and it is expected that all the work will be completed during the winter of 1910-11.

Appropriations: —

Chapter 358, Acts of 1904,	\$5,000
Chapter 546, Acts of 1908,	5,000
Chapter 124, Resolves of 1909,	10,000
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Total,	\$20,000

The amount expended during the year is \$14,479.22.

The total amount expended for the improvement of this harbor to Dec. 1, 1910, is \$17,126.67.

LOBSTER COVE.

Petition of Geo. A. Ricker and others for further improvement of Lobster Cove in the city of Gloucester, presented to the Board March 18, 1910.

This cove is tributary to Annisquam River, and a channel 50 feet wide on the bottom and 6 feet deep at mean low water, extending from the channel of said river near the house of the Annisquam Yacht Club to the mouth of this cove opposite Fish Market wharf, was dredged in 1909, under authority of chapter 131 of the Resolves of that year, which appropriated \$2,500 for the work. The petition presented as above was for the dredging of an anchorage basin 6 feet deep at mean low water, extending beyond the work done in 1909.

A survey was made and an estimate of cost prepared for dredging an anchorage basin and widening the channel connecting the basin with the main channel of Annisquam River.

The city of Gloucester appropriated \$1,500 in aid of this project.

On Nov. 18, 1910, a contract was entered into with J. P. O'Riorden, to dredge an anchorage basin about 268,000 square feet in area in this cove, and to widen the channel about 500 feet in length, connecting this anchorage basin with the main channel of Annisquam River, all dredging to be to the depth of 6 feet at mean low water. The amount of material to be removed is estimated to be about 80,000 cubic yards, scow measurement, and the contract price is $22\frac{5}{8}$ cents per cubic yard, measured in scows.

The total amount appropriated for Lobster Cove to Dec. 1, 1909, was \$2,500.

The amount expended during the year is \$1,118.04.

MENAMSHA INLET.

Petition of Daniel H. Flanders and others for further improvement of Menamsha Inlet in the towns of Chilmark and Gay Head, presented to the Board Feb. 14, 1910.

This inlet, which is used largely as a harbor of refuge for fishermen and others, has been improved under various appropriations made by the Legislature since the year 1897 by the construction of jetties and by dredging, the total expenditure to Dec. 1, 1909, being \$45,673.30.

A survey was made in March, 1910, to ascertain the condition of the jetties and channel and obtain data for an estimate of cost. Subsequently, a project was prepared comprising the dredging of the channel and anchorage basin, the building of a training wall or embankment, and the strengthening of the outer ends of the two jetties by placing additional stone.

The town of Chilmark appropriated \$700 in aid of this project.

On June 3, 1910, a contract was entered into with the Eastern Dredging Company, to dredge the channel and make the same 75 feet wide on the bottom and 6 feet deep at mean low water from Vineyard Sound southeasterly for a distance of about 1,500 feet, with a basin of the same depth at the inner end about 200 feet long and 150 feet wide; the westerly portion of the basin just inside the jetties to be redredged to the same depth; the outer ends of the jetties to be strengthened with granite quarry grout; and an embankment, about 200 feet in length, of sand protected by stone riprap to be built on the easterly side of the channel as a training wall. The contract prices were: for dredging and for building the earth portion of the training wall, the sum of \$5,790; for furnishing and placing stone in jetties and riprap, \$2.15 per ton.

All work covered by this contract was completed on Sept. 10, 1910, and in addition a channel 50 feet wide and about 600 feet long was dredged from the easterly end of the anchorage basin, following the line of the old channel to the commencement of the bluff on which the Tilton House stands, at a cost of \$2,000; also, 100 tons of riprap on the easterly side of the main channel was removed from the space where the proposed training wall was to be built, and afterwards placed as riprap on the banks of the training wall, at a cost of \$100.

The total cost, including supervision and incidental expenses, was \$11,697.08.

The total amount expended to Dec. 1, 1910, is \$57,370.38.

OLD HARBOR.

Petition of Patrick H. O'Connor and others for further improvement of Old Harbor in Dorchester Bay, presented to the Board June 10, 1910.

Under authority of chapter 425 of the Acts of 1902, the Commonwealth dredged two anchorage basins in Old Harbor, Dorchester Bay: one, known as the 6-foot area, located near the L Street bath-house and the club house of the Mosquito Fleet Yacht Club; the other and larger basin, known as the 9-foot area, near the public landing and the South Boston and Boston Yacht Club houses. This work was completed March 31, 1906, the total expenditure therefor being \$100,239.96.

The petitioners desired to have the channel in Old Harbor deepened, and the basin for about 500 feet west from a point opposite K Street in South Boston extended and dredged.

A survey was made in November, 1910, and an estimate of cost prepared. Proposals were invited, and on Nov. 18, 1910, a contract was entered into with the Eastern Dredging Company, to excavate an anchorage basin off the southerly shore of South Boston near the club house of the Mosquito Fleet Yacht Club, to the depth of 6 feet at mean low water, within an area about 1,000 feet long and 600 feet wide; also to excavate to the depth of 7 feet at mean low water a portion of the channel leading to this basin within an area about 1,800 feet long and varying in width from 50 feet to 275 feet.

The amount of material to be removed is estimated to be about 96,000 cubic yards, scow measurement, in the anchorage basin, and 22,000 cubic yards, scow measurement, in the entrance channel. The contract prices are $21\frac{9}{10}$ cents per cubic yard for dredging the anchorage basin, and $28\frac{1}{10}$ cents per cubic yard for dredging the entrance channel.

Total appropriation for work previously done, \$100,000.

The amount expended during the year is \$286.31.

The total amount expended in this locality to Dec. 1, 1910, is \$100,526.27.

SESUIT HARBOR.

Petition of A. L. Crowell, chairman of the board of selectmen of the town of Dennis, and others, for further improvement of

Sesuit Harbor in the town of Dennis, presented to the Board Jan. 21, 1910.

A stone jetty was built at this harbor in 1908, under an appropriation of \$10,000 made in that year. This jetty extended from the shore to the gap in the old jetty, about 630 feet from the bluff at the inner end of the jetty. The petitioners requested the extension of this jetty, for the purpose of restoring the good harbor which existed there for many years previous to the destruction of the old jetty.

A survey was made and an estimate of cost of the desired work prepared. The town of Dennis appropriated \$1,000 in aid of this project.

On April 29, 1910, a contract was entered into with John Cashman & Sons Company, to build an extension of the stone jetty on the easterly side of the entrance to this harbor, about 300 feet in length, substantially on the line of the old jetty, which had nearly all been washed away. The contract price was \$1.73 per ton for furnishing the stone and building the extension.

The structure was completed on Aug. 31, 1910, stone to the amount of 5,652 tons having been furnished and placed, so that the jetty was extended about 500 feet, making a total length of about 900 feet from the shore. This is the most easterly harbor along this part of the coast which it is feasible to improve and obtain a reasonable depth of water at low tide, as at this point the low-water line begins to trend offshore, so that a few miles further east the low-water line is nearly a mile beyond the high-water line.

The total amount expended on this project, including supervision and incidental expenses, was \$10,226.10.

Surveys and estimates have been made, under authority of chapter 481 of the Acts of 1909, in connection with petitions other than those which have been favorably acted upon, and the contributions by municipal authorities and others, allotments and expenditures, appear in the following table: —

APPROPRIATION FOR IMPROVEMENT OF RIVERS AND HARBORS, UNDER
CHAPTER 481 OF THE ACTS OF 1909.

PROJECTS.	Allotment.	Contribution by Municipality or Others.	Total Cost.	Expended in 1910.
<i>Projects where Work has been done or contracted for.</i>				
Bucks Creek, Chatham,	\$9,000 00	\$1,000 00	\$10,000 00	\$2,797 67
Centreville River, Barnstable, . . .	5,900 00	1,500 00	7,400 00	2,294 70
Cohasset Harbor,	24,000 00	12,000 00	36,000 00	21,191 76
Connecticut River, Hadley, ¹	7,484 82	500 00	7,984 82	7,005 72
Cotuit Harbor,	6,200 00 ²	2,000 00	8,200 00	164 90
Herring River, Harwich,	227 93 ²	—	227 93	227 93
Lobster Cove, Gloucester,	15,000 00	1,500 00	16,500 00	134 21
Lynn Harbor, ¹	1,843 27	200 00	2,043 27	2,043 27
Menamsha Inlet, Gay Head and Chilmark, ¹	10,997 08	700 00	11,697 08	11,697 08
Old Harbor, southerly shore of South Boston.	8,222 04 ²	—	28,000 00	286 31
Sesuit Harbor, Dennis, ¹	9,226 10	1,000 00	10,226 10	10,226 10
Witchmere Harbor, Harwich,	700 00	—	700 00	—
<i>Projects where Surveys and Investigations have been made.</i>				
Hingham Harbor,	175 20	—	175 20	175 20
Ipswich River,	201 75	—	—	201 75
Lake Anthony, Oak Bluffs,	208 31	—	—	208 31
Paskamansett River, South Dartmouth,	95 20	—	—	95 20
Scorton Harbor, Sandwich,	51 35	—	—	51 35
Sippican Harbor, Marion,	7 17	—	—	7 17
Stony Beach, Hull,	107 90	—	—	107 90
Taunton River,	298 12	—	—	298 12
Wild Harbor, Falmouth,	7 14	—	—	7 14
Advertising,	46 62	—	—	46 62
Total,	\$100,000 00	\$20,400 00	—	\$59,268 41

¹ Contract completed.² Sum allotted to complete work done under previous appropriation.³ Balance of cost to be allotted from appropriation of 1911.

BASS RIVER, YARMOUTH.

The improvement of this river by the Commonwealth has been confined to its entrance channel, where two jetties, originally of piles and timber, were built, and a channel between them, across the flats, was dredged, this work being completed in

1902. Subsequently further dredging was done, and the jetties were protected in part with stone. The total amount expended to Dec. 1, 1909, was \$42,271.10.

Under authority of chapter 123 of the Resolves of 1909, appropriating \$10,000 for extending and completing the improvement of this river, a contract was entered into on July 14, 1909, with the firm of Connolly Brothers, to fill in a section of the easterly jetty which had been undermined by the current, and to reinforce about 1,700 feet in length of the inner portion of this jetty, the contract price being \$2.30 per ton for stone delivered in place. This work was completed on March 1, 1910, stone to the amount of 3,920 tons having been placed along this jetty for a distance of about 1,800 feet. The cost, including supervision and incidental expenses, was \$9,999.94.

Appropriations: —

Chapter 39, Resolves of 1901,	\$500
Chapter 113, Resolves of 1901,	22,000
Chapter 46, Resolves of 1903,	15,000
Chapter 123, Resolves of 1909,	10,000
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Total,	\$47,500

The amount expended during the year is \$5,200.62.

The total amount expended to Dec. 1, 1910, is \$47,471.72.

BENSON'S POND IN MIDDLEBOROUGH.

Chapter 91 of the Resolves of the year 1910 requires that this Board "shall investigate the condition and possible utility of Benson's pond, . . . especially with a view to its sale or use for commercial purposes, and shall report in print thereon to the next general court."

Benson's Pond is a great pond, having an area of about 32 acres, including an island. The surrounding shore is low and partly wooded. The watershed tributary to the pond, according to the topographical map, is about 326 acres. Within a radius of 5 miles of the pond are several areas of swamp and low land. A highway runs along the easterly and southerly sides of the pond quite near the shore.

The whole shore of the pond is owned by Samuel B. Gibbs,

who desires to purchase the pond, drain it and convert it into a cranberry bog.

The outlet of the pond is at the southerly end, where the shore comes within 200 feet of the highway called East Street. The surface of the water in the pond is about 2 inches above the bottom of the old culvert under East Street. The town of Middleborough reconstructed this old culvert during the summer of 1910, and if the brook or channel from the culvert to the shore of the pond were cleaned of weeds and mud, the water in the pond would flow through the reconstructed culvert and fall slightly below its present level.

The surface of the pond is mostly covered with grass, and the water, except in certain spring holes, varies from a few inches deep to $1\frac{1}{2}$ or 2 feet. It is lower this year than it has been at other times, though the level of the old culvert in East Street and the channel from the culvert to the pond indicate that the level of the water has never been maintained at a very much higher elevation. Certain evergreen trees on the shore of the pond near the present water line also indicate that the water level has never been maintained very much over a foot above the present level.

A public hearing was given by the Board in Middleborough on Sept. 26, 1910, and an adjourned hearing at the State House on Oct. 19, 1910. Statements were made by residents, shore owners, the selectmen of Middleborough and other persons on the subject of converting the pond into a cranberry bog. The selectmen and other town officers of Middleborough spoke in favor of the undertaking.

A large number of persons objected to the sale of the pond. The Massachusetts Fish and Game Protective Association was represented by its president, who protested against the sale. A number of sportsmen desired the pond preserved as a fishing ground and breeding place for game and insectivorous birds. The statements of those familiar with the locality indicate that there probably are a few pickerel in the pond, and perhaps a few other fish, but it is not a pond much resorted to by fishermen. Some persons had seen young ducks about the pond a few times in several years. There were also statements showing that birds resorted there.

The owners of a cranberry bog south of East Street through which Sampson's Brook flows also appeared and objected to the sale and conversion of the pond. The mill owners on the Wewantitt River in Wareham objected on the ground that the carrying out of the project would interfere to some extent with their right to receive the flowage of water from the pond. The quantity of water flowing from the pond through Wewantitt River to the mills in Wareham appears to be very small. Mr. Gibbs's counsel estimated that the quantity of water was hardly sufficient to produce one and one-half horse-power at the mill-wheel in Wareham.

After accurately ascertaining the material facts, the Legislature must determine the public policy to be pursued. Should the rights of the Commonwealth in great ponds held for the public since early colonial days be relinquished and the land under the same be sold to private persons for commercial purposes?

The Commonwealth has frequently granted to cities and towns the right to take water from great ponds for public uses, and has granted the right to dam the outlet and raise the level and flow the land on the shore, provided due compensation is made to owners of the shore and outlet. It has never, so far as this Board is informed, sold a great pond with authority to drain the water and use the land for commercial purposes, but that fact is not conclusive in this instance.

By the provisions of the resolve the Board is uncertain whether the Legislature desired it to examine Benson's Pond and the surrounding country and simply report the facts and conditions; or whether an expression of opinion was desired as to the propriety or public policy of selling its interest in this great pond to persons who would use and improve it.

The area, level, depth, outlet, ownership of the shore and varied interests involved are briefly outlined above, as shown by the examination of the locality and statements at the public hearings.

If a sale should be deemed advisable by the Legislature, it seems reasonable that all parties interested should be given an equal opportunity to purchase.

(1) The mill owners 7 miles away on the Wewantitt River,

to which Sampson's Brook is tributary, might think it worth while to bid something to maintain the pond at its high level as a storage basin, to be drawn down in dry times.

(2) The owners of the cranberry bog on the brook 1,000 feet south of the highway might bid for the pond as a reservoir, to be drawn in flooding their bog.

(3) The Massachusetts Fish and Game Protective Association, or some individual sportsmen, might be willing to raise money enough to secure this pond as a fish and game preserve.

(4) The Audubon Society might like to acquire it for the breeding of birds, if the price seemed reasonably low.

(5) Samuel B. Gibbs, the owner of the whole of the surrounding shore, desires to purchase the shallow pond and convert it into a cranberry bog. It was not intimated at the hearings how much he considered the 32 acres to be worth. His representative stated that the bog when made and improved would be worth \$40,000. The cost of the improvement was not stated.

The owners of cranberry bogs and other land bordering on the brook which forms the outlet of the pond, also the mill owners on the Weweantitt River in Wareham to which the brook is a small feeder, are evidently entitled to some recognition. They have rights in the flow of water through the brook. The vested interests are very small, perhaps inappreciable, but they must be noticed.

It was contended by Mr. Gibbs that the flow of water in the brook would be increased by converting the pond into a bog and opening the springs in the pond so that the water could flow freely to the ditches. This was disputed.

In view of the embarrassments which may accompany a sale of this pond, it is perhaps as well for the Commonwealth to retain its rights in this public reservation for whom it may concern, whether for bird and fish preserves, cranberry culture or mill wheels, or such unknown public uses as may in the future develop.

CAPE COD CANAL.

Under the provisions of chapter 448 of the Acts of 1899, incorporating the Boston, Cape Cod & New York Canal Company, the Board of Railroad Commissioners and the Board of Harbor

and Land Commissioners were constituted a Joint Board for the purposes defined in said act. The act of 1899 was amended by chapter 476 of the Acts of 1900. Additional legislation is contained in chapter 519 of the Acts of 1910.

A statement covering previous proceedings before this Board and the Joint Board, and actions taken on the several petitions presented, is contained in the report of this Board for the year 1909, pp. 17-19.

On Jan. 7 and March 9, 1910, hearings were held on the petitions of the Boston, Cape Cod & New York Canal Company, filed Dec. 29, 1909, for an amendment of the order of the Joint Board of June 3, 1907, in relation to the crossing of the canal by the railroad of the Old Colony Railroad Company near Buzzards Bay station. On May 11, 1910, an order was passed amending the order of June 3, 1907, changing the points of crossing.

On Jan. 7, 1910, plans of a proposed highway bridge across the canal at points designated by the County Commissioners of Barnstable County, Oct. 26, 1909, changed by the Canal Company to conform to an order of the Joint Board, dated Nov. 22, 1909, were approved. This bridge is to be located about 1,440 feet west of the present highway bridge at Bourne village.

On March 23, 1910, the Board of Harbor and Land Commissioners heard parties interested in a petition of the Canal Company, presented March 9, 1910, for the assignment of three areas to be used as dumping grounds in Buzzards Bay for dredged material, located as follows: southwest of Eustis Rock, between Wenaumet Neck and Scraggy Neck; south and southeasterly of Southwest Ledge and Seal Rocks; north and northwesterly of Split Rock and south of Nye's Neck.

Considerable opposition to the dumping in these places of material dredged for the purposes of the canal was manifested at this hearing by summer residents, yachtsmen, boatmen and fishermen, who claimed that the dumping would cause material shoaling outside the dumping grounds, and would seriously damage the scallop industry in the upper part of the bay. The petitioners claimed that it was necessary to have additional dumping grounds, and that in severe weather it delayed the work and was dangerous to tow loaded scows to the previously

assigned dumping ground, located by the War Department about 1 mile west of the entrance to West Falmouth harbor, and authorized to be used under a permit from the Board, granted July 30, 1909, and that dumping grounds nearer the site of dredging operations would greatly expedite the work under contract.

Subsequently, it was suggested that in lieu of the three localities named above a dumping ground between Dry Ledge and Abiel's Ledge be assigned; and after a public hearing, on June 8, 1910, and careful consideration of this matter, a permit for dumping in this place was granted on June 13, 1910, to be used, however, only as a dumping ground for small scows, and large scows only whenever in the opinion of the inspector employed by the Board it is unsafe to tow large scows to the dumping ground off West Falmouth harbor.

On May 11, 1910, orders were passed by the Joint Board rescinding paragraph 3 of the order of the Joint Board under date of June 26, 1899, in respect to the issue of stock and bonds, and certifying and approving the issue by the Canal Company of 5,990 shares of stock of the par value of \$100 each, and \$600,000 in bonds.

On Sept. 9 and Nov. 23, 1910, orders were passed certifying and approving the issue by the Canal Company of stock and bonds aggregating 8,190 shares of stock and \$820,000 in bonds, making authorization to Dec. 1, 1910, of a total of 14,180 shares of stock of the par value of \$100 each, and \$1,420,000 in bonds. These orders in relation to stock and bonds were issued in accordance with the requirements of chapter 448 of the Acts of 1899, as amended by chapter 476 of the Acts of 1900, and upon requisition of the Cape Cod Construction Company to the Boston, Cape Cod & New York Canal Company for the amounts of stock and bonds of said Canal Company under and in accordance with the contract between said Canal Company and said Construction Company, dated March 27, 1907, accompanied by estimates made by the chief engineer of the Canal Company as to the amount of work done and expenditures made, which had previously been examined and verified by the Joint Board and its engineer.

At the Barnstable Bay end of the canal the breakwater con-

struction has progressed rapidly during the past season, and at the inner end for a short distance the breakwater is completed for its full width and slopes. Beyond this point for a length of about 800 feet the northerly side slope has been completed. Beyond this last point the core and body of the breakwater has been built up to a height considerably above high water, to a point within 200 feet of the outer end. Approximately 45 per cent. of the breakwater construction has been done, and work thereon has ceased for the winter.

At the Barnstable Bay end of the canal one large hydraulic dredge is still at work. A large scoop dredge has arrived from the south, and others are to follow, and these are to be used in excavating the main portion of the canal, beginning at the present end of the main excavation, which is about $1\frac{1}{4}$ miles from the Barnstable Bay end of the canal.

The material excavated at the Barnstable Bay end has been almost entirely deposited on the banks or marshes alongside the canal. The material which is to be excavated by the scoop dredges is to be mainly carried out into Barnstable Bay and dumped in deep water. From Barnstable Bay for a distance of about $1\frac{1}{4}$ miles the main portion of the excavation has been made. Beyond a point about $1\frac{1}{2}$ miles from the Barnstable Bay shore the only excavation done is the removal of material from the side slopes of the canal by land excavators.

At the Buzzards Bay end operations have been chiefly confined to the 4 miles of approach channel, approximately one-third of the volume having been excavated. A small amount of excavation has been done in Monument River, just above the highway bridge on the shore road in Bourne. The material was deposited on the south bank of the river.

A railroad bridge and approaches have been completed at Buzzards Bay to carry the relocation of the Old Colony division of the New York, New Haven & Hartford Railroad across the canal.

At Bourne village foundations have been completed for a highway bridge to take the place of the present shore road and Bourne Village bridges.

About 3 miles of new railroad are required to rearrange the existing railroad lines clear of the canal location. The contract

for doing this work, as well as the necessary highway changes connected with it, has been let and work commenced.

On Nov. 30, 1910, approximately 25 per cent. of the total work on the canal had been completed.

CHATHAM.

The work of protecting the bluff at Watch Hill and in front of the Hotel Mattaquason, at Chatham, under contract between the Commonwealth and Messrs. Sears, Eldridge & Taylor, dated Aug. 6, 1909, which was nearly completed at the date of the last report of the Board, was entirely finished in December, 1909. At that time the ground was frozen, and it was thought that it would be necessary to shift a small amount of stone to properly cover the bluff. An examination of the locality was made late in the summer of this year, and it was found that the stone had worked well down into place, and it was not therefore deemed necessary to do any further work.

The cost, including supervision and incidental expenses, was \$14,968.75.

Appropriation:—

Chapter 126, Resolves of 1909, \$15,000

The amount expended during the year is \$2,244.34.

The total amount expended to Dec. 1, 1910, is \$14,968.75.

CUTTYHUNK HARBOR.

Under appropriations made in 1905 and 1907, two stone jetties were built at the harbor entrance.

By chapter 132 of the Resolves of 1909, \$10,000 was appropriated in addition to amounts previously authorized, to be expended for the improvement of this harbor, provided that no part of the money appropriated by this resolve should be expended unless the town of Gosnold should pay into the State treasury \$5,000, and secure land for a public landing place on the shore of the harbor.

The town paid this amount, acquired land for a public landing and built an oak pile wharf thereon.

On Dec. 10, 1909, a contract was entered into with John R. Burke of Quincy, Mass., to dredge a channel 60 feet wide on the bottom, 12 feet deep at mean low water and about 2,200 feet long, extending from the outer harbor to deep water just inside the Narrows at the entrance to Cuttyhunk Pond, and for dredging to the same depth an anchorage basin 300 feet long and 150 feet wide just inside the Narrows. The contract price is \$15,600.

The commencement of the work was delayed by unfavorable weather, but it was so far advanced on July 3, 1910, that the steamer which plies between New Bedford and the Island during the summer months was able to reach the wharf, and this continued daily thereafter throughout the summer season.

The dredging of the channel as originally planned is now nearly completed, and in addition the outer portion of the channel has been widened and a sharp angle near the inner portion cut off. The Board was enabled to do this work within the cost as originally estimated, owing to the low price at which the contract was let.

Appropriations: —

Chapter 33, Resolves of 1900,	\$1,000
Chapter 450, Acts of 1905,	5,000
Chapter 542, Acts of 1907,	7,500
Chapter 142, Resolves of 1908,	7,500
Chapter 132, Resolves of 1909,	10,000
By the town of Gosnold,	5,000
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Total,	\$36,000

The amount expended during the year is \$15,349.39.

The total amount expended to Dec. 1, 1910, is \$30,551.34.

HERRING RIVER, HARWICH.

The mouth of this river has been improved in the past by the construction of jetties and by dredging.

By chapter 499 of the Acts of 1909, the Board was further authorized to dredge, to extend the jetties and otherwise improve the mouth of the river, the appropriation therefor being \$10,000.

A project was adopted comprising the raising and strengthening of the existing jetties, also the extension of the jetties; and on Nov. 26, 1909, a contract was entered into with William Sears & David A. Eldridge to carry out the same, the contract price being \$2.60 per ton. The improvement was completed on Sept. 1, 1910, the easterly jetty having been extended about 200 feet, the westerly jetty about 50 feet, and the whole length of each jetty strengthened and raised with heavy quarry grout.

The cost, including supervision and incidental expenses, was \$10,227.93.

Appropriations: —

Chapter 66, Resolves of 1901,	\$500
Chapter 399, Acts of 1905,	10,000
By the town of Harwich,	2,000
Chapter 499, Acts of 1909,	10,000
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Total.	\$22,500

The amount expended during the year is \$10,136.68.

The total amount expended to Dec. 1, 1910, is \$22,765.08.

HERRING RIVER DIKE, WELLFLEET.

By chapter 183 of the Acts of 1908, the Board was authorized and directed to construct a dike, with ditches and structures incident thereto, at or near the mouth of Herring River, in Wellfleet. Under this act the town of Wellfleet was to provide \$10,000, to be expended by this Board in addition to the appropriation of \$10,000 by the State. On April 24, 1908, a contract was entered into with Thomas & Connor of Middleborough, Mass., to build this dike, the contract price being \$16,250. The plans for a fishway through the dike were approved May 1, 1908, by the Commissioners on Fisheries and Game. The dike was closed on Sept. 20, 1909. Subsequently, a leak developed under the southerly sluice box and settlement occurred in the filling under all the sluices. This was remedied by closing the leak with concrete and filling a space under the floor of the flume with cement grout.

All work was completed on May 24, 1910, the total cost, including supervision and incidental expenses, being \$20,-548.86.

In October, 1910, the town of Wellfleet was notified that the dike and fishway were completed, and that the town is authorized to maintain and operate the same, as provided in chapter 511 of the Acts of 1907.

The working of the gates has been watched through the summer, and they appear to keep the water in the basin above the dike down to within a few inches of the floor of the sluice. During the spring, when the alewives or herring were running, it was difficult for them to pass up through the gates. To obviate this as much as possible, counterweights were placed on the tide-gates, and they were found to work very satisfactorily, allowing the water to drain off more readily than it did before the weights were installed, and at the same time offering a free passage to the fish for a considerable length of time on each tide. It was found to be practically impossible to keep the sluice-gate open as a fishway, owing to the fact that a larger volume of water would pass up through this single gate into the basin, when the surface of the water below was higher than the surface of the water above the dike, than could be discharged through the three gates during the time when the water below was lower than the water above the dike.

This dike was built to permit the drainage of the marsh land above the dike, and to abolish or reduce the pest of mosquitoes. During the past season the town and private individuals have expended considerable sums of money in ditching and draining the marshes, and it is reported that the mosquito pest has been very much less during the past summer than for many previous seasons.

Appropriations: — .

Chapter 183, Acts of 1908,	\$10,000
By the town of Wellfleet.	10,000
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Total,	\$20,000

The amount expended during the year is \$5,486.06.

The total amount expended to Dec. 1, 1910, is \$20,815.29, a portion of which was paid from the appropriation for the survey and improvement of harbors.

HINGHAM HARBOR.

By chapter 125 of the Resolves of 1909, the sum of \$5,000 was appropriated, in addition to \$5,000 appropriated in 1908, for dredging in this harbor. The town of Hingham was authorized to appropriate \$3,000 and pay the same into the State treasury, to be expended under the direction of this Board for the purpose of aiding the Commonwealth in carrying out the work provided for in the resolve. This amount having been paid by the town and an agreement having been made with the United States engineer officer in charge of river and harbor work in this district to dredge the outer portion of the channel in this harbor as far as the government appropriation would allow, a contract was entered into on Sept. 28, 1910, with Charles M. Cole, to dredge an anchorage basin to the depth of 6 feet at mean low water, and a channel 75 feet wide and 6 feet deep at mean low water to connect this basin with the channel to be dredged by the United States; also, to widen about 500 feet in length of the channel which is to be dredged by the United States 50 feet wide, so that the whole channel shall be 75 feet wide and 6 feet deep at mean low water to the anchorage basin.

The amount of material to be removed is estimated to be about 60,000 cubic yards, scow measurement, and the contract price is 26½ cents per cubic yard, measured in scows.

The work of the United States was completed in November, 1910, and the dredging for the Commonwealth was commenced thereafter. It is expected that this improvement will be fully completed before the next yachting season.

Appropriations:—

Chapter 109, Resolves of 1908,	\$5,000
Chapter 125, Resolves of 1909,	5,000
By the town of Hingham,	3,000
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Total,	\$13,000

The amount expended during the year is \$201.28.

The total amount expended to Dec. 1, 1910, is \$215.02.

HOUSATONIC RIVER.

By chapter 110 of the Resolves of 1910, the Board was authorized and directed to cause that part of the Housatonic River which is within the town of Sheffield to be surveyed and plotted for a distance of not less than 10 miles, commencing at the Connecticut line and following the course of the river northerly; to inquire and determine to what extent, if any, the banks of this river have been changed; the abutments of bridges over the same weakened; the lands and highways in Sheffield overflowed, made wet or swampy, by the erection and maintenance of the dam across this river of the Berkshire Power Company of North Canaan, Conn. The resolve also provided that a copy of the survey be prepared and deposited in the South Berkshire registry of deeds, and that it or an attested copy shall be competent evidence, in any judicial proceeding, of the facts therein contained.

In August, 1910, the chief engineer of the Board made an examination of this river and the locality to be covered by the survey, and conferred with the selectmen of Sheffield and others in relation to matters contained in the resolve. It appeared to be necessary to survey a very large area of land, extending from the State line to a point a short distance above the village of Sheffield, and it was estimated that the cost thereof would be from \$1,500 to \$2,000, and even the larger amount might be exceeded by reason of further necessary work as the survey progressed, to comply fully with the requirements of the resolve.

This matter was considered by the Board in September, 1910, and it was concluded that, inasmuch as no funds have been provided for this survey, no further action be taken, and that the conclusion of the Board be reported to the Legislature.

LAKE QUANNAPOWITT.

By chapter 539 of the Acts of 1909, this Board is required, within one year from the acceptance of the act by the town of Reading, to fix the elevation of low water in this lake, as established by the act, with reference to some suitable permanent base, and record the same in the registry of deeds for

the southern district of the county of Middlesex, and to file copies of the document so recorded with the town clerk of Wakefield, the town clerk of Reading and with this Board.

The act was accepted by the town of Reading Nov. 30, 1909.

Bench marks have been established and described in a report which has been recorded and filed as required.

A conference has been held with parties interested in other provisions of the act relating to the purchase or taking of certain flowage rights, but no conclusion has yet been reached.

LYNN HARBOR.

Upon the receipt of certain releases from riparian owners, the Board, acting under authority of chapter 110 of the Resolves of 1908, entered into a contract on Dec. 14, 1909, with John H. Gerrish, for the dredging in Lynn harbor, to a depth of 6 feet at mean low water, of an anchorage basin about 350 feet square, on the easterly side of the channel leading to the wharf of the Peoples Coal Company, and for dredging to the same depth a channel to connect this basin with the main harbor channel which had been dredged by the United States, all the dredging being outside the proposed location of Market Street extension. The contract price was $17\frac{9}{10}$ cents per cubic yard, measured in scows, and the appropriation was \$10,000. Before the dredging of the area covered by the contract was completed, at the request of the Lynn Yacht Club, which contributed therefor \$200, the area of the anchorage basin was increased and an allotment was made from the general appropriation under chapter 481 of the Acts of 1909. All work was completed July 21, 1910, the total amount of dredging done being 61,606 cubic yards, at a total cost, including supervision and incidental expenses, of \$12,003.28.

The report of this Board, under the provisions of chapter 501 of the Acts of 1909 (House No. 234), in relation to plans for the development of this harbor, was submitted Jan. 14, 1910.

Appropriations: —

Chapter 110, Resolves of 1908.	\$10,000
Chapter 501, Acts of 1909.	1,000
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Total,	\$11,000

The amount expended on account of this harbor during the year is \$12,638.15, of which \$2,043.27 was paid from the general appropriation under chapter 481 of the Acts of 1909.

The total amount expended to Dec. 1, 1910, is \$12,788.05.

NEPONSET RIVER.

By an act of Congress approved March 2, 1907, an appropriation of \$125,233.34 was made for dredging a channel through Dorchester Bay and the mouth of Neponset River to Commercial Point and thence to the Neponset highway bridge, with the proviso that no part of the appropriation should be expended until the Secretary of War should have received satisfactory assurance that the improvement of that portion of the river lying above this bridge shall be made and hereafter maintained by the State of Massachusetts or other agency without expense to the government of the United States.

The improvement contemplated under this proviso was to secure a channel 6 feet deep from Neponset highway bridge to Milton Mills, 100 feet wide between the said bridge and the Granite bridge, 75 feet wide thence to Godfrey's wharf, and thence 50 feet wide for a further distance of 250 feet. By chapter 125 of the Resolves of 1907, the Commonwealth appropriated \$34,270.44, to be expended in the improvement of that part of this river above the Neponset highway bridge, provided that no portion of this amount should be expended until the United States shall have completed the improvement of Dorchester Bay and this river to the said highway bridge.

By chapter 24 of the Resolves of 1908, the conditions set forth in said act of Congress, approved March 2, 1907, were accepted by the Commonwealth; and, upon notification by the engineer officer in charge that the United States had completed the dredging to the Neponset highway bridge, a contract was entered into on April 1, 1910, with Charles M. Cole, to dredge a channel from the Neponset Avenue highway bridge to the New York, New Haven & Hartford Railroad, Shawmut branch, bridge at Milton Mills, said channel to be 6 feet deep at mean low water, with the following widths: 100 feet wide between the Neponset Avenue highway bridge and the Granite bridge; 75 feet wide from the Granite bridge to Godfrey's coal

wharf; and 50 feet wide from Godfrey's coal wharf to the railroad bridge. The contract price was 29 $\frac{1}{10}$ cents per cubic yard, measured in scows.

All of this work was completed on Aug. 6, 1910, and in addition an anchorage basin 400 feet long and 150 feet wide was excavated in the cove just below Godfrey's wharf, but on the opposite side of the river.

The cost, including supervision and incidental expenses, was \$34,269.70.

Appropriation: —

Chapter 125, Resolves of 1907,	\$34,270.44
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The total amount expended to Dec. 1, 1910, is \$34,269.70.

PENIKESSE ISLAND.

The claims against the contractor who built a pile wharf at this island in extension of the existing stone wharf, under a contract with the Commonwealth, dated Aug. 3, 1908, which claims had not been adjusted at the date of the last report of the Board, have since been passed upon by the Superior Court, and payment of \$1,409 made to the contractor.

Appropriations: —

Chapter 118 of the Resolves of 1908,	\$5,000
Chapter 93 of the Resolves of 1909,	300
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Total,	\$5,300

The amount expended during the year is \$1,631.

The total amount expended at this island to Dec. 1, 1910, is \$5,192.95.

PLYMOUTH HARBOR.

The dredging of a channel in this harbor, from the "Cow Yard" to the Plymouth Cordage Company's wharf, authorized by chapter 531 of the Acts of 1907, is now in progress under a contract with the Eastern Dredging Company dated Sept. 4, 1908.

Work on the outer channel has been completed, and the channel is now about 1,100 feet long, 250 feet wide and 20 feet deep at mean low water.

The inner channel, which constitutes the main portion of the work and is to be about 5,000 feet long, 150 feet wide and 18 feet deep at mean low water, has been dredged over, but some shoal places have not as yet been excavated to the required depth. Work on the turning basin near the wharf of said company is now in progress and is nearly completed.

The cost of this improvement, up to the sum of \$160,000, is to be paid one-half by the Commonwealth and one-half by the town of Plymouth.

Appropriations: —

Chapter 95, Resolves of 1906.	\$400
Chapter 531, Acts of 1907.	80,000
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Total,	\$80,400

The amount expended during the year is \$40,566.40.

The total amount expended to Dec. 1, 1910, is \$111,374.68.

PROVINCE LANDS.

The reclamation of the territory belonging to the Commonwealth, known as the Province Lands, located in Provincetown, and containing about 3,290 acres, has been in progress under the direction of the Board since 1893. The method adopted for this work is the planting of beach grass, shrubs and trees to cover and hold the blowing sands, and has been fully described in previous reports.

In March, 1910, the work of removing brown-tail moths was resumed. During the spring season operations were confined to brushing and the transplanting of pines and shrubs, no beach grass being planted, as the best results are obtained by planting this sand binder in the fall of the year.

There have been transplanted during the year about 10,517 small pines, on the sod; about 28,312 three-year-old seedlings; and 4,800 hills of Scotch broom, — all with excellent results. The work of transplanting beach grass and bayberry, and brushing, was resumed in the fall, resulting in the covering of about 17 acres with grass and bayberry and about 8 acres with brush.

About 110 acres of uncovered sand dunes still remain on these lands for future treatment.

The sum of \$153.07 has been paid into the State treasury during the year, being the amount received from licenses which have been issued to various parties to cultivate and pick cranberries in the bogs on these lands, and to mow meadow lands.

Appropriations: —

1893-1905, inclusive, aggregate,	\$48,000
Chapter 545, Acts of 1908,	10,000
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Total,	\$58,000

The amount expended during the year is \$2,416.77.

The total amount expended to Dec. 1, 1910, is \$52,694.93.

SCITUATE.

After the great storm of November, 1898, which did so much damage along the coast, the Commonwealth made liberal appropriations for the repair and protection of the shores and high-ways in Scituate and in other places. The work done during and since the year 1900 has been under the charge of this Board, \$38,300 having been appropriated therefor. At the Sand Hills 998 feet of concrete sea wall was built, to prevent the sea from breaking through the beach into Scituate harbor; 1,450 feet of similar wall was built along the crest of the beach between Damon's Island and the Glades; 2,340 feet of wall was built to protect the highway and other property near the end of Beach Street at North Scituate. At the Third Cliff about 1,000 feet of the cliff was protected by heavy stone riprap.

In addition to the work done by the Commonwealth, nearly an equal amount of sea wall was built by the town and individuals. All these structures were apparently effective until the great storm of Christmas, 1909. This storm, which exceeded in violence that of 1898 and the storm of 1851, damaged nearly all the walls which had been built by the town and private parties, and also damaged a short section, about 120 feet, of the wall built under the direction of this Board near the end of Beach Street at North Scituate. In front of other sections of the wall in the same locality the beach had washed away to such an extent that it was feared that another storm might undermine portions of the wall. The walls between Damon's

Island and the Glades and the walls on the north and south sides of Scituate harbor, as well as the riprapp protective work at the Third Cliff, were practically undamaged.

In order to repair the damage done at North Scituate, and as far as possible to anticipate and prevent future damage in that locality, plans were prepared for underpinning about 250 feet of the sea wall and replacing the 120 feet of wall which had been undermined and thrown down. In addition, in order to prevent so far as possible the wearing away of the beach in front of the wall, spur jetties, each about 25 feet long and extending at right angles to the face of the wall, were built along the whole face of the wall in this locality at distances of from 100 to 150 feet apart.

A contract for this work was entered into on Sept. 2, 1910, with William H. Connor, and the same was completed on Nov. 3, 1910. The total cost, including supervision and incidental expenses, was \$2,342.70, which is to be paid from the appropriation for the survey and improvement of harbors.

Appropriation: —

1900-09, inclusive, aggregate, \$38,300

The amount expended during the year is \$2,445.15.

The total amount expended to Dec. 1, 1910, is \$39,318.66.

STATE BOUNDARIES.

For the purpose of preserving and maintaining the monuments and marks on the State boundary lines, section 4 of chapter 1 of the Revised Laws requires that the Board of Harbor and Land Commissioners shall in the year 1905 and every fifth year thereafter examine and inspect all the monuments or other marks defining the location of the boundary lines of the Commonwealth: and if any of them have been injured, displaced, removed or lost, said commissioners shall, in co-operation with persons duly authorized by the adjoining State, restore them or replace them with suitable stone monuments, and in the same manner set suitable stone monuments at points not properly marked, where the State boundary is intersected by the boundary of any counties, cities or towns in the Commonwealth, or by a highway or railroad.

An appropriation of \$1,500 was made by chapter 142 of the Acts of 1910 to pay the expenses of the perambulation. A general history of the establishment and marking of these boundary lines will be found in the report of the Board for the year 1905.

The boundary line between Massachusetts and Rhode Island was perambulated in company with George H. Carpenter, Commissioner for Rhode Island, in April and May, 1910. Five bounds were found to be loose in the ground, or leaning badly, and were reset, boulders and concrete being used for filling around them. A sixth bound was found in a field which was being cultivated, where it was a nuisance to the proprietor; and, as a new road had been built across the line a short distance to the east of this monument, it was taken up and reset on the easterly side of what is known as Snow Street, between Attleborough and Pawtucket. The other bounds along the line were found to be in good condition.

The line between Massachusetts and Connecticut was perambulated during October, 1910, in company with Henry R. Buck, who had been appointed to represent the State of Connecticut. The bounds on this line were all found to be in good condition. One bound at the south end of Congamond Lake had been pushed slightly out of plumb, apparently by the ice, but it was firmly set.

The line between Massachusetts and New York was perambulated in September, 1910, in company with H. J. Stabile, who had been appointed to represent the State of New York. On this line six monuments were found to be loose and leaning, and these have all been reset and secured by boulders and concrete.

The line between Massachusetts and Vermont was perambulated in July and August, 1910, in company with William W. Stickney, State Boundary Line Commissioner of Vermont. Three monuments were found to be loose, and were reset with boulders and concrete. A fourth monument, situated where the old, disused Stebbins Road crossed the line in the towns of Guilford and Bernardston, was taken up and reset on the easterly side of the new Stebbins Road, about 933 feet easterly

of its old position. This new road has been built since the line was re-marked a few years ago.

The line between Massachusetts and New Hampshire was perambulated in June, 1910, in company with Orrin M. James, representing the State of New Hampshire. All the bounds were found to be in good condition except eight, which were either loose or leaning. These have all been reset with boulders and concrete.

With the exception of two or three cases where the marks were iron bolts set in a ledge, the monuments found to be loose or leaning were situated in springy ground, where the supporting earth had been loosened by the frost. The method of preventing the recurrence of this was to excavate the hole around the bound and fill in a bed of boulders and concrete around the base of the monument, filling in the top with the earth well rammed into place. Stones treated in this way have been found to withstand frost very well.

The total cost of the work done during the year is \$1,282.38.

On October 26, notice was received from the Governor of the State of New York that on June 9, 1910, he had approved a statute establishing as the boundary between Massachusetts and New York the line which had been established by Massachusetts by chapter 374 of the Acts of 1901. This completes the establishment of all the boundary lines surrounding Massachusetts as they are now marked.

TOWN BOUNDARY SURVEY.

The work of determining the location of the town boundaries has been continued with the same organization as in the last few years, except that one of the assistant engineers was detached during a considerable portion of the field season to perambulate and examine the monuments marking the various lines between Massachusetts and the surrounding States.

One party continued the survey of a group of 28 towns along the northern boundary of the State, extending from the Connecticut River to the New York line. This country is very rough, and progress is slow on account of the long distances which the parties have to travel going to and from their work.

Another party completed the survey of a group of towns in the central portion of the State lying easterly of and adjoining the Connecticut River, and has commenced work on another group of towns westerly of and bordering on the Connecticut River.

Difficulty has been encountered, as in previous years, in finding many of the bounds, which are located in the woods and inaccessible places. A few bounds have been found to be missing, but the selectmen have generally been ready to proceed at once and replace them.

During the year the locations of 137 points marking angles in town lines, and 129 survey points, mostly on summits of hills, have been determined by triangulation. Topographical surveys have been made of $33\frac{1}{2}$ miles of rivers and streams, principally the Connecticut, Green, Westfield, Westfield Little and the West Branch of Swift rivers, and 2 miles of highway forming parts of boundary lines; also 14 miles of highway and about 8 miles of railroad have been surveyed where they form portions of boundary lines or are incidental to other surveys.

During the year the Board has proposed the straightening of six crooked or indefinite boundary lines, which had been previously surveyed. In one case the towns refused to concur with the Board, and in two others both towns concurred and the recommendations were forwarded to the Legislature. The other three are now awaiting action by the towns. The case referred to in the last report, where the straightening of a very crooked line was proposed and one town concurred but the other did not, has since been settled by the second town concurring.

The statutes defining the boundary line between the towns of Colrain and Leyden are so indefinite that the board has been unable to determine what the boundary line is. The southerly portion of the line is Green River. but whether the boundary follows the center of the river, or some portion of the westerly bank as is claimed by some of the residents in the vicinity, is not defined by the statute. The northerly portion appears to be partly a straight line and partly some portion of the river; the Board cannot, from the statute, determine where it is located, if it is a straight line. The selectmen state that

they propose to set a bound at the southerly end of the straight line, but have not as yet done so; and the statute does not make it clear as to whether this straight line should be followed for its whole length, or only a portion of the way and some part of the river the balance. When the commissioners to mark the boundary line between Massachusetts and Vermont were marking that line, they set a monument to mark the intersection of this town line with the State line; just what information they had to guide them in setting this bound is unknown. These facts are brought to the attention of the Legislature in order that some action may be taken defining exactly what is the boundary line. A plan showing Green River the whole length of the boundary line and what monuments were found by the survey party was made during the past summer, and is on file in the office of the Board.

One atlas, describing the boundaries of 21 cities and towns, viz., Ashburnham, Ashby, Athol, Bernardston, Erving, Fitchburg, Gardner, Gill, Leominster, Lunenburg, Montague, Northfield, Orange, Phillipston, Royalston, Templeton, Townsend, Warwick, Wendell, Westminster and Winchendon, was received from the printer and distributed. Owing to the delay of some of the towns in acting upon the recommendations of the Board for straightening the boundary lines, no other atlases have been prepared for the printer; but the information is now ready and 2 atlases, describing the boundaries of 37 towns, will probably be prepared and printed during the coming year.

Up to Dec. 1, 1910, atlases describing the boundaries of 248 cities and towns, out of a total of 354 in the Commonwealth, have been completed and distributed as provided by statute. The field work for two other groups, describing the boundaries of 37 cities and towns, has been completed and the material is now being prepared for publication.

VINEYARD HAVEN HARBOR.

The only work done in this harbor during the year was the placing of iron clamps in the beacons at the outer ends of the structure, under the contract entered into on Aug. 6, 1909, with E. S. Belden & Sons. The total cost of extending this

breakwater, including supervision and incidental expenses, was \$9,996.72.

This breakwater was not damaged by the very severe storm of December, 1909, and a number of fishing boats rode out the storm in the lee of the structure.

Appropriations: —

Chapter 95, Resolves of 1904,	\$500
Chapter 442, Acts of 1905,	10,000
Chapter 526, Acts of 1908,	10,000
Chapter 500, Acts of 1909,	10,000
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Total,	\$30,500

The amount expended during the year is \$1,435.28.

The total amount expended to Dec. 1, 1910, is \$30,231.86.

On Sept. 9, 1910, a conveyance was made by the Commonwealth to the United States of the title to a tract of land, 25 feet by 25 feet, under the outer end of this breakwater for the purpose of erecting a light or other aids to navigation thereon, together with a right of way to officers and employees of the United States Light House establishment over this breakwater to the tract conveyed.

WEST FALMOUTH HARBOR.

All work under a contract entered into on Aug. 14, 1908, with John H. Gerrish, for dredging to the depth of 6 feet at mean low water a channel through the bar at the harbor entrance, dredging an anchorage basin between Abbots Point and the town landing, and rounding off the angle in the channel at the point opposite Abbots Point, was completed on May 21, 1910.

On July 1, 1910, all work under another contract with John H. Gerish, entered into July 2, 1909, was completed, the work accomplished being the widening of the channel at the harbor entrance 50 feet, making the same 100 feet wide for a distance of about 650 feet; the extension of the anchorage basin east of Abbots Point to the public landing; and the dredging of an anchorage basin on the southerly side of the channel and east

of Chapoquoit Island, — all to a depth of 6 feet at mean low water.

Material to the amount of 48,244 cubic yards was excavated under these contracts, the larger part being deposited on the shore by means of a hydraulic dredge, the balance being dumped in deep water in Buzzards Bay.

The total cost of the improvement, including supervision and incidental expenses, was \$19,050.99.

Appropriations: —

Chapter 31, Resolves of 1906,	\$500
Chapter 512, Acts of 1907,	5,000
Chapter 112, Resolves of 1908,	10,000
Chapter 138, Resolves of 1909,	10,000
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Total,	\$25,500

The amount expended during the year is \$7,772.81.

The total amount expended to Dec. 1, 1910, is \$23,379.47.

WEYMOUTH FORE RIVER.

By chapter 133 of the Resolves of 1909, the Board was directed to dredge the shoals in the upper part of the river in the channel excavated by the United States government.

On May 11, 1910, a contract was entered into with J. P. O'Riorden, to dredge the channel of this river so that from a point about 1,250 feet northeasterly from the northeasterly corner of Richard's coal wharf to the Braintree bridge it shall be 75 feet wide on the bottom, and for a length of about 500 feet between the Braintree bridge and Sheppard's coal wharf the bottom width shall be 50 feet, all dredging to be to a depth of 6 feet at mean low water. The contract price was 29¾ cents per cubic yard, measured in scows. Owing to the favorable price for which the work was let, the Board was enabled to extend the dredging to the required depth and width a distance of about 1,200 feet farther towards the river mouth. This improvement was completed on July 9, 1910, material to the amount of 34,108 cubic yards having been excavated and taken to sea.

The total cost, including supervision and incidental expenses, was \$9,999.66.

Appropriations:—

Chapter 440, Acts of 1903,	\$25,000
Chapter 126, Resolves of 1908,	2,500
Chapter 133, Resolves of 1909,	10,000
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Total,	\$37,500

The amount expended during the year is \$10,001.66.

The total amount expended to Dec. 1, 1910, is \$24,066.70.

WRECKS AND OBSTRUCTIONS.

In December, 1909, it was reported that the schooner "S. J. Lindsey," sunk in the south channel of Mystic River, was an obstruction to navigation. Agreements were made with Betts Brothers & Co. to straighten the vessel, which was lying on her side, her masts obstructing the passage of vessels, and to raise and float her. This work was completed and the vessel sold to the contractors as part payment to them. The net cost to the Commonwealth was \$500.

In April, 1910, a scow reported adrift in Boston harbor was removed from tide water and disposed of at a cost of \$100.

In November, 1910, an old water boat sunk in Dorchester Bay near the entrance to the anchorage basin and in the vicinity of the public landing at City Point, South Boston, which obstructed navigation, was removed at a cost of \$90.

Complaints in relation to other wrecks and obstructions have been received during the year, but it has not been necessary for the Board to make any expenditure from the appropriation for their removal.

Whenever a wreck is so located that action by the United States government, rather than by the State, seems proper, it is brought to the attention of the engineer officer in charge of the district.

Appropriation:—

Chapter 142, Acts of 1910,	\$2,000
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The amount expended during the year is \$690.

SALE AND DISPOSITION OF MASSACHUSETTS ATLAS SHEETS
AND TOWN BOUNDARY ATLASES.

Under authority of chapter 57, Resolves of 1890, chapter 42, Resolves of 1891, and chapter 360, Acts of 1900, 5,308 atlas sheets of the map of the Commonwealth and 13 sets in portfolios have been sold during the year, for which \$320.65 was received. Under the provisions of chapter 26, Resolves of 1909, there has been expended from this amount \$129 for the purchase from the United States Geological Survey of sheets required to keep in stock at all times copies of all the atlas sheets, leaving a balance of \$191.65, which has been forwarded to the Treasurer and Receiver-General, as required by the resolve.

Chapter 360, Acts of 1900, as amended by chapter 484 of the Acts of 1909, directed this Board to make certain disposition of the atlases of the boundary lines of the various cities and towns in the Commonwealth. Under this authority 81 atlases have been distributed during the year.

LICENSES GRANTED DURING THE YEAR.

Nos.

- 3419. Petition of the city of Boston for license to fill solid in Boston harbor, at Rainsford Island. Granted Dec. 6, 1909.
- 3420. Petition of the Humphrey Coal Company for license to build a pile dolphin in Marblehead harbor, in Marblehead. Granted Dec. 6, 1909.
- 3421. Petition of the Edison Electric Illuminating Company of Boston for approval of plans for laying two 3-inch cables in Charles River at Warren bridge, in Boston, as authorized by the Commissioner of Wires of Boston, under authority of chapter 249, Acts of 1898. Granted Dec. 6, 1909.
- 3422. Petition of the Edison Electric Illuminating Company of Boston for approval of plans for laying two 3-inch cables in Chelsea Creek at Meridian Street bridge, in Boston and Chelsea, as authorized by the Commissioner of Wires of Boston, under authority of chapter 249, Acts of 1898. Granted Dec. 6, 1909.
- 3423. Petition of the Nashawena Mills for license to build a bulkhead, lay a pipe, construct a pile and timber intake well and dredge a channel in Acushnet River, in New Bedford. Granted Dec. 15, 1909.

Nos.

3424. Petition of the Nonquitt Spinning Company for license to fill solid, construct a pile and timber intake well, lay a 24-inch pipe and dredge a channel in Acushnet River, in New Bedford. Granted Dec. 15, 1909.
3425. Petition of Theodore H. Tyndale for approval of plans for the construction of three pile bridges in Mashpee, under authority of chapter 134, Acts of 1908. Granted Dec. 22, 1909.
3426. Petition of Alice T. Herrick for license to build a wharf in Buzzards Bay, in Wareham. Granted Dec. 27, 1909.
3427. Petition of Andrew Fiske for license to build and maintain a pier and float in Red Brook Harbor at Cataumet, in Bourne. Granted Dec. 27, 1909.
3428. Petition of Marie Audet for license to build a wharf on Taunton River, in Fall River. Granted Dec. 27, 1909.
3429. Petition of D. Blakely Hoar and William H. Dunbar, trustees, for license to build a sea wall and culvert and to fill solid in Crystal Cove, in Winthrop. Granted Dec. 27, 1909.
3430. Petition of the Edison Electric Illuminating Company of Boston for approval of plans for laying two 3-inch cables in Charles River at Charlestown bridge, in Boston, under authority of chapter 249, Acts of 1898. Granted Jan. 21, 1910.
3431. Petition of George C. Thomas, Jr., for license to fill solid and build a wharf in Sippican harbor at Stewards Island, in Marion. Granted Jan. 21, 1910.
3432. Petition of Nannie R. Rice for license to lay a water pipe and electric light and telephone cables in Sippican harbor from Nye's wharf to Ram Island, in Marion. Granted Jan. 21, 1910.
3433. Petition of E. E. C. Swift for license to build a bulkhead and pile platform, to fill solid and to dredge in Deacons Pond harbor, in Falmouth. Granted Jan. 26, 1910.
3434. Petition of the Metropolitan Park Commission for license to fill solid in Charles River between Cambridge Street and Western Avenue, in Boston. Granted Jan. 31, 1910.
3435. Petition of John R. Nelson and Hilda Carlson for license to build a pile wharf and float and a pile platform in Dorchester Bay, in Quincy. Granted Jan. 31, 1910.
3436. Petition of Edith A. Richards for license to extend a wharf on piles on Mystic River, in Boston. Granted Feb. 7, 1910.
3437. Petition of the Frank E. Davis Fish Company for license to widen its wharf on piles in Gloucester harbor, in Gloucester. Granted Feb. 11, 1910.
3438. Petition of Rufus H. Small for license to build a pile wharf and marine railway in Witchmere harbor, in Harwich. Granted Feb. 11, 1910.

Nos.

3439. Petition of the Boston & Albany Railroad, the New York Central & Hudson River Railroad Company, lessee, for license to build pier No. 5 in Boston harbor at East Boston, also a pile structure in dock No. 5, and to dredge. Granted Feb. 18, 1910.
3440. Petition of Lilian M. Hobart for license to build a sea wall and fill solid in Hull Bay, in Hull. Granted Feb. 18, 1910.
3441. Petition of Bradford Weston for license to build a sea wall and fill solid in Hull Bay, in Hull. Granted Feb. 18, 1910.
3442. Petition of the Hallet & Davis Piano Company for license to build a pile wharf on Neponset River, in Boston. Granted Feb. 18, 1910.
3443. Petition of Harry W. Dudley and J. Samuel Hodge for license to build a sea wall, bulkheads and pile pier, to fill solid and dredge in Broad Sound, in Revere. Granted March 9, 1910.
3444. Petition of the town of Gosnold for license to build a pile wharf in Cuttyhunk harbor, at Cuttyhunk. Granted March 9, 1910.
3445. Petition of H. Annie Allen and Gannett F. Allen for license to erect a building on piles on Weir River, in Hull. Granted March 18, 1910.
3446. Petition of the Cochrane Chemical Company for license to build a bulkhead and fill solid on Mystic River, in Everett. Granted March 18, 1910.
3447. Petition of the Hallet & Davis Piano Company for license to build a pile wharf on Neponset River, in Boston. Granted March 18, 1910.
3448. Petition of the New York, New Haven & Hartford Railroad Company for license to fill solid and build a conduit in Tenean Creek, in Boston. Granted March 18, 1910.
3449. Petition of the New York, New Haven & Hartford Railroad Company for license to fill solid and build a conduit in Bay Ridge Creek, in Boston. Granted March 18, 1910.
3450. Petition of the Nantasket Beach Steamboat Company for license to drive fender piles at Nantasket pier on Weir River, in Hull. Granted March 30, 1910.
3451. Petition of the Nantasket Beach Steamboat Company for license to build an addition on piles to Pemberton pier in Hull Bay, in Hull. Granted March 30, 1910.
3452. Petition of the Cottage Park Hotel Corporation for license to maintain structures already built, forming a swimming pool, and to build bath-houses on piles and a plank jetty in extension of Bartlett Road in Boston harbor, in Winthrop. Granted April 6, 1910.
3453. Petition of David G. Pratt for license to build and maintain a pile pier and float in Buzzards Bay at Long Neck, in Wareham. Granted April 6, 1910.

Nos.

3454. Petition of the Corinthian Yacht Club for license to build and maintain a wharf and float in Marblehead harbor, in Marblehead. Granted April 6, 1910.
3455. Petition of Louisa C. Bacon for license to build and maintain a pile pier in Mattapoisett harbor, in Mattapoisett. Granted April 6, 1910.
3456. Petition of the Central Square Wharf Company for license to extend its wharf on piles in Boston harbor, at East Boston. Granted April 6, 1910.
3457. Petition of William H. Norton for license to maintain and extend his wharf on piles in Edgartown harbor, in Edgartown. Granted April 6, 1910.
3458. Petition of the American Agricultural Chemical Company for license to extend its wharf on piles on Weymouth Back River, in Weymouth. Granted April 13, 1910.
3459. Petition of John H. Proctor for license to build and maintain a wharf and float in Gloucester harbor at Eastern Point, in Gloucester. Granted April 13, 1910.
3460. Petition of Lura M. Tilden for license to widen and extend wharves and to fill solid in Cohasset harbor, in Cohasset. Granted April 13, 1910.
3461. Petition of William A. Donald for license to build and maintain a pile pier and two floats on Bass River, in Yarmouth. Granted April 13, 1910.
3462. Petition of Edward S. Groves for license to build a timber breakwater in Hull Bay, in Hull. Granted April 22, 1910.
3463. Petition of the Boston & Maine Railroad for license to widen a portion of its road bed on Annisquam River, in Gloucester. Granted April 27, 1910.
3464. Petition of the Boston & Maine Railroad for license to reconstruct its bridge on piles on Annisquam River, in Gloucester. Granted April 27, 1910.
3466. Petition of the Connecticut Valley Lumber Company for license to hang and maintain booms in and across Connecticut River, in Gill and Montague. Granted May 6, 1910.
3467. Petition of the Connecticut Valley Lumber Company for license to hang and maintain booms in and across Connecticut River, in Northampton and Hadley. Granted May 6, 1910.
3468. Petition of Emma F. Keith for license to build a pile platform and maintain two floats in Hull Bay, in Hull. Granted May 6, 1910.
3469. Petition of Daniel F. Small for license to build pile structures in Provincetown harbor, in Provincetown. Granted May 6, 1910.

Nos.

3470. Petition of the county commissioners of the counties of Plymouth and Norfolk for approval of plans for widening and improving the bridge and approaches thereto in and over the outlet of Straits Pond and in Weir River, in Hull, Cohasset and Hingham, under authority of chapter 482, Acts of 1909. Granted May 6, 1910.
3471. Petition of the Metropolitan Water and Sewerage Board for approval of plans for constructing a tunnel and laying a 36-inch water pipe across Chelsea Creek near Chelsea Street bridge, in Boston and Chelsea, under authority of chapter 291, Acts of 1910. Granted May 16, 1910.
3472. Petition of the Wessagussett Yacht Club for license to build and maintain a pile pier and two floats on Weymouth Fore River, in Weymouth. Granted May 16, 1910.
3473. Petition of Charles B. Osborn and Charles G. M. Dunham for license to build and maintain a pile pier in Edgartown harbor, in Edgartown. Granted May 16, 1910.
3474. Petition of Henry D. Swift for license to build and maintain a wharf in West Falmouth harbor, at West Falmouth. Granted May 16, 1910.
3475. Petition of the city of Boston for license to fill solid in Chelsea Creek, at East Boston. Granted May 20, 1910.
3476. Petition of John P. Eustis for license to build bulkheads, runways and floats and to fill solid in Hull Bay, in Hull. Granted June 1, 1910.
3477. Petition of Lester N. Godfrey, Samuel A. Morse and Jessie P. Morse for license to extend their wharf on Neponset River, in Milton. Granted June 1, 1910.
3478. Petition of Charles H. Bagnell for license to build and maintain a pile pier and float in Kingston Bay at Rocky Nook, in Kingston. Granted June 1, 1910.
3479. Petition of the Quissett Mill for license to build a bulkhead, wall and pile wharf and to fill solid on Acushnet River, in New Bedford. Granted June 1, 1910.
3480. Petition of William Berger for license to build a pile platform in Lake Whalom, in Lunenburg. Granted June 1, 1910.
3481. Petition of Marie C. F. Wales for license to build a boat landing, float and dike and to fill solid in Buzzards Bay at Pocasset, in Bourne. Granted June 1, 1910.
3482. Petition of the American Agricultural Chemical Company for license to extend its wharf on piles in Weymouth Back River, in Weymouth. Granted June 6, 1910.
3483. Petition of Frank C. Taylor for license to build a pile wharf and four dolphins on Acushnet River at Crow Island, in Fairhaven. Granted June 6, 1910.

Nos.

3484. Petition of the Boston Elevated Railway Company for license to build a bulkhead and pile wharf and to fill solid in Boston harbor near the Reserved Channel, at South Boston. Granted June 15, 1910.
3485. Petition of the Nonquitt Spinning Company for license to build a sea wall and pile wharf and to fill solid on Acushnet River, in New Bedford. Granted June 20, 1910.
3486. Petition of Denison Brothers Company for license to extend a wharf on piles on Acushnet River, in New Bedford. Granted June 22, 1910.
3487. Petition of the Edison Electric Illuminating Company of Boston for license to lay and maintain two 3-inch cables in and under Charles River near Western Avenue bridge, in Boston and Watertown. Granted June 24, 1910.
3488. Petition of Susan H. B. Long for license to build and maintain a float and runway in Cohasset harbor at White Head, in Cohasset. Granted June 27, 1910.
3489. Petition of the Kilburn Mill for license to build and maintain a sea wall, lay a pipe, construct two intake wells and fill solid in Clark's Cove, in New Bedford. Granted June 27, 1910.
3490. Petition of Christine Campbell for license to construct a building in Manchester harbor, in Manchester. Granted June 29, 1910.
3491. Petition of the Magnolia Wharf Corporation for approval of plans for the construction of a wharf and landing stage in Easterly Kettle Cove at Magnolia, in Gloucester, under authority of chapter 576, Acts of 1908, and chapter 115, Acts of 1910. Granted July 13, 1910.
3492. Petition of the New England Gas and Coke Company for license to build bulkheads and pile structures, to fill solid and dredge in Island End River, in Everett and Chelsea. Granted July 29, 1910.
3493. Petition of the American Hide and Leather Company for license to build a pile trestle across North River Canal near Flint Street, in Salem. Granted July 29, 1910.
3494. Petition of Wilson G. Crosby for license to build and maintain a pile pier in Edgartown harbor, in Edgartown. Granted July 29, 1910.
3495. Petition of Joseph C. Snow for license to build a sea wall and fill solid in Buzzards Bay at Broadview, in Mattapoisett. Granted July 29, 1910.
3496. Petition of the Amherst Power Company for license to lay and maintain a telephone cable and to string wires in and across Connecticut River, in Hadley and Easthampton. Granted Sept. 12, 1910.

Nos.

3497. Petition of the town of Hull for license to lay and maintain a submarine cable in Hull Bay from the mainland to Peddocks Island, in Hull. Granted Sept. 12, 1910.
3498. Petition of the Staples Coal Company for license to build a pile trestle in a dock on Taunton River, in Fall River. Granted Sept. 21, 1910.
3499. Petition of the city of Salem for license to rebuild its drawbridge and pile pier, to build a stone and concrete abutment and to drive piles at Union Street on South River, in Salem. Granted Sept. 21, 1910.
3500. Petition of the Old Colony Railroad Company for license to rebuild the drawbridge and to maintain an embankment on North River, in Marshfield and Scituate. Granted Sept. 21, 1910.
3501. Petition of the town of Cohasset for license to build a gate in Straits Pond, in Cohasset. Granted Sept. 28, 1910.
3502. Petition of the Haverhill Electric Company for license to build a sea wall, drive piles and fill solid on Merrimac River, in Haverhill. Granted Sept. 28, 1910.
3503. Petition of George C. Hitchcock for license to build a sea wall and pile wharf and fill solid in Cotuit Bay at Cotuit, in Barnstable. Granted Sept. 30, 1910.
3504. Petition of William B. Crosby for license to build a sea wall and pile wharf, to fill solid and maintain a building on piles in Cotuit Bay at Cotuit, in Barnstable. Granted Sept. 30, 1910.
3505. Petition of Mary L. Barton for license to rebuild and extend a pile pier in Cotuit Bay at Cotuit, in Barnstable. Granted Sept. 30, 1910.
3506. Petition of Ezra J. Gifford for license to build a sea wall and pile wharf, to fill solid and to maintain a building on piles in Cotuit Bay at Cotuit, in Barnstable. Granted Sept. 30, 1910.
3507. Petition of the Salem Gas Light Company for license to build a wall and fill solid in Collins Cove, in Salem. Granted Sept. 30, 1910.
3508. Petition of Henry M. Kingman for license to build and maintain a sea wall and two piers and to fill solid in West Falmouth harbor, in Falmouth. Granted Sept. 30, 1910.
3509. Petition of Rosa J. Hobson for license to build a sea wall, fill solid and construct a building on piles in Cotuit Bay at Cotuit, in Barnstable. Granted Sept. 30, 1910.
3510. Petition of Samuel H. Childs for license to build a sea wall and a building on piles and to fill solid in Cotuit Bay at Cotuit, in Barnstable. Granted Sept. 30, 1910.

Nos.

3511. Petition of Charles Cogswell for license to build and maintain a pile wharf and a pile and timber breakwater in Edgartown harbor, in Edgartown. Granted Oct. 7, 1910.
3512. Petition of the New Bedford Gas and Edison Light Company for license to lay a gas pipe in Acushnet River at Coggeshall Street bridge, in New Bedford and Fairhaven. Granted Oct. 7, 1910.
3513. Petition of Emma H. Moore for license to build a sea wall and fill solid in Little Harbor at Woods Hole, in Falmouth. Granted Oct. 10, 1910.
3514. Petition of the city of Boston for license to build a sea wall and fill solid in Boston harbor at Eastern Avenue wharf, in Boston. Granted Oct. 14, 1910.
3515. Petition of the Nantasket Beach Steamboat Company for license to rebuild Yacht Club wharf on piles in Hull Bay, in Hull. Granted Oct. 14, 1910.
3516. Petition of the city of Boston for license to extend Eastern Avenue wharf and rebuild a ferry pier on piles in Boston harbor, in Boston. Granted Oct. 24, 1910.
3517. Petition of the Booth Manufacturing Company for license to lay a 24-inch iron pipe and construct an intake well on piles on Acushnet River at Clark's Point, in New Bedford. Granted Oct. 24, 1910.
3518. Petition of the General Electric Company of New York for license to build a wall, fill solid and construct an inlet and outlet conduit on Saugus River, in Lynn. Granted Oct. 24, 1910.
3519. Petition of Samuel Cabot, Incorporated, for license to build a pile and timber structure and a pile platform on Chelsea Creek, in Chelsea. Granted Oct. 26, 1910.
3520. Petition of Bessie Goldberg for license to build a sea wall and fill solid in Palmers Cove, in Salem. Granted Oct. 26, 1910.
3521. Petition of the city of Boston for license to fill solid and place riprap on Freeport Street near Commercial Point bridge, in Boston. Granted Nov. 2, 1910.
3522. Petition of the Morrill-Atwood Ice Company for license to fill solid and maintain filling and structures in Lake Quannapowitt, in Wakefield. Granted Nov. 18, 1910.
3523. Petition of the Edison Electric Illuminating Company of Boston for license to build bulkheads and dredge in Boston harbor near the Reserved Channel, at South Boston. Granted Nov. 21, 1910.
3524. Petition of the city of Boston for license to dump snow and ice into tide waters. Granted Nov. 21, 1910.

Nos.

3525. Petition of the Boston Elevated Railway Company for license to dump snow and ice into tide waters. Granted Nov. 21, 1910.
3526. Petition of Jerome C. Borden for license to extend his wharf on Taunton River, in Fall River. Granted Nov. 30, 1910.
3527. Petition of Frank Keezer, Lillian M. Keezer and Bernard F. Carahar for license to build sea walls and a pile wharf and to fill solid in Broad Sound, in Nahant. Granted Nov. 30, 1910.
3528. Petition of the Salem Electric Lighting Company for license to build a sea wall, drive fender piles and fill solid on South River, in Salem. Granted Nov. 30, 1910.
3529. Petition of the Naumkeag Steam Cotton Company for license to build a sea wall, drive fender piles and fill solid on South River, in Salem. Granted Nov. 30, 1910.
3530. Petition of the Plymouth Cordage Company for license to build a wharf in Plymouth harbor, in Plymouth. Granted Nov. 30, 1910.
3531. Petition of Byrmina M. Hird for license to build a bulkhead and fill solid in Hull Bay, in Hull. Granted Nov. 30, 1910.
3532. Petition of Johannes Moeller for license to build a pile wharf and to dredge in Taunton River, in Somerset. Granted Nov. 30, 1910.
3533. Petition of Greene & Wood for license to build a pile wharf, sea wall and bulkhead and to fill solid on Acushnet River, in New Bedford. Granted Nov. 30, 1910.
3534. Petition of the Butler Mill Corporation for license to build a sea wall, drive fender piles and fill solid in New Bedford harbor at Clark's Point, in New Bedford. Granted Nov. 30, 1910.
3535. Petition of John Duff for license to build a sea wall and pile wharf, drive fender piles and fill solid in New Bedford harbor at Clark's Point, in New Bedford. Granted Nov. 30, 1910.
3536. Petition of the Holmes Manufacturing Company for license to build a sea wall, drive fender piles and fill solid in New Bedford harbor at Clark's Point, in New Bedford. Granted Nov. 30, 1910.
3537. Petition of the heirs of Rodolphus Ashley, and Robert A. Terry for license to build a sea wall, drive fender piles and fill solid in New Bedford harbor at Clark's Point, in New Bedford. Granted Nov. 30, 1910.

MISCELLANEOUS PERMITS GRANTED DURING THE YEAR.

- WILLIAM L. MILLER, to use for storage purposes a portion of the Commonwealth Pier, at South Boston. Granted Dec. 1, 1909.
- TOWN OF CARVER, to remove rocks and boulders from Sampson's Pond, in Carver. Granted Dec. 15, 1909.
- EASTERN DREDGING COMPANY, to dredge in Dorchester Bay, between Savin Hill and Commercial Point. Granted Dec. 17, 1909.
- THOMAS BUTLER & Co., to remove from tide water the U. S. S. "Enterprise," and to break up and burn the same on the beach at Point of Pines, in Revere. Granted Dec. 23, 1909.
- JAMES S. SWEENEY, to dump ashes on the Commonwealth flats, at South Boston. Granted Dec. 27, 1909.
- ELLEN M. BOARDMAN, to remove gravel from Salter's Beach, in Plymouth. Granted Dec. 27, 1909.
- ISAAC BLAIR & Co., to dump snow from Dover Street bridge into tide water, in Boston. Granted Dec. 29, 1909.
- BOSTON MOLASSES COMPANY, to use for storage purposes a portion of the Commonwealth flats, at South Boston. Granted Dec. 30, 1909.
- JOHN T. SCULLY FOUNDATION AND TRANSPORTATION COMPANY, to open, occupy and use an area along Fargo Street on the Commonwealth flats at South Boston, for the purpose of making excavations and driving piles, in connection with the construction of a building on Fargo Street. Granted Dec. 29, 1909.
- COUGHLAN & SHEILS COMPANY, to dump excavated material on the Commonwealth flats, at South Boston. Granted Jan. 19, 1910.
- J. P. O'RIORDEN, to dredge material from Boston harbor, between Gallops Island and Nix's Mate. Granted Jan. 31, 1910.
- BAY STATE DREDGING COMPANY, to dredge material in Boston harbor, between Gallops Island and Nix's Mate. Granted Feb. 7, 1910.
- BOSTON & MAINE RAILROAD, to dredge in the south channel of Mystic River, in Boston. Granted Feb. 7, 1910.
- EASTERN DREDGING COMPANY, to dredge material in Boston harbor, between Gallops Island and Nix's Mate. Granted Feb. 7, 1910.
- RICHARD A. NAGLE, to dump on the Commonwealth flats, at South Boston, material taken in the city of Boston. Granted Feb. 11, 1910.
- ARTHUR F. ESTABROOK, to remove stone, sand and gravel from Phillips Beach, in Swampscott. Granted Feb. 4, 1910.
- EASTERN DREDGING COMPANY, to dredge material from Great Brewster Spit, in Boston harbor. Granted Feb. 28, 1910.
- JOSEPH GAHM & SON, to dump ashes on the Commonwealth flats, at South Boston. Granted March 4, 1910.
- FRANK ROSE, to use and occupy Quarantine Rock, in Boston harbor. Granted March 9, 1910.

- NEW BEDFORD YACHT CLUB, to erect and maintain a light upon the breakwater built by the Commonwealth in Apponagansett harbor. Granted March 24, 1910.
- R. S. BRINE TRANSPORTATION COMPANY, to dump on the Commonwealth flats, at South Boston, material taken in the city of Boston. Granted March 30, 1910.
- EASTERN DREDGING COMPANY, to dredge material from Shirley Gut, in Boston harbor. Granted April 6, 1910.
- EASTERN DREDGING COMPANY, to dredge material from Great Brewster Spit, in Boston harbor. Granted April 6, 1910.
- LOTT PHILLIPS, to remove stone and rocks from his beach at Brant Rock, in Marshfield. Granted April 12, 1910.
- LIEUT. W. P. LAURIAT, to moor the U. S. S. "Gresham" in the Commonwealth dock at South Boston, for the purpose of making repairs. Granted April 12, 1910.
- F. L. GODDING, to remove material from the beach at Clifton, in Marblehead. Granted April 20, 1910.
- METROPOLITAN CONTRACTING COMPANY, to use for storage purposes a portion of the Commonwealth flats, at South Boston. Granted April 20, 1910.
- THE FRED S. AND H. D. GORE CORPORATION, to dump on the Commonwealth flats, at South Boston, material taken in the city of Boston. Granted April 22, 1910.
- BOSTON CONSOLIDATED GAS COMPANY, to lay and maintain a gas main in D Street, on the Commonwealth flats, at South Boston. Granted April 13, 1910.
- FREDERIC D. FISK and JOSEPH SARGENT, trustees of the Main Street Land Trust, to dredge material from their flats in Charles River on the Cambridge side of the channel, near Cambridge bridge. Granted April 27, 1910.
- BROWN-WALES COMPANY, to make sewer connection with the sewer built by the Commonwealth in C Street, South Boston. Granted May 2, 1910.
- NEW BEDFORD, MARTHAS VINEYARD & NANTUCKET STEAMBOAT COMPANY, to dredge in New Bedford harbor. Granted May 4, 1910.
- FORE RIVER SHIPBUILDING COMPANY, to dredge in Weymouth Fore River, in Quincy. Granted May 4, 1910.
- TOWN of MANCHESTER, to dredge in Manchester harbor. Granted May 16, 1910.
- FRANK J. HANNON, to dump ashes and gravel on the Commonwealth flats at South Boston. Granted May 18, 1910.
- FRANK J. HANNON, to excavate and remove material from Weymouth Fore River and a portion of the beach at Monatiquot Bluffs, in Weymouth. Granted May 23, 1910.
- ROGERS & WEBB, to moor vessels in the Commonwealth dock. Granted May 25, 1910.

- CAPT. JAMES P. PARKER, to moor the U. S. ships "Chicago," "Rodgers" and "Foote" in the Commonwealth dock, at South Boston. Granted May 25, 1910.
- BOSTON, CAPE COD & NEW YORK CANAL COMPANY, to dump dredged material in Buzzards Bay, between Abiel's Ledge and Dry Ledge. Granted June 13, 1910.
- OTTO SCHNEIDER, to excavate and remove material from shore lots at Hough's Neck, in Quincy. Granted July 6, 1910.
- J. P. O'RIORDEN, to dredge material from Shirley Gut, in Boston harbor. Granted July 6, 1910.
- NEW BEDFORD GAS AND EDISON LIGHT COMPANY, to dredge in Acushnet River, in New Bedford. Granted July 18, 1910.
- GREENE & WOOD, to dredge in New Bedford harbor. Granted July 29, 1910.
- T. V. DOYLE & Co., to dump on the Commonwealth flats, at South Boston, material taken in the city of Boston. Granted July 29, 1910.
- CITY OF NEW BEDFORD, to dredge in Acushnet River, in New Bedford. Granted Aug. 25, 1910.
- EDWIN B. HOLMES, to dredge in Hull Bay, in Hull. Granted Aug. 25, 1910.
- J. P. O'RIORDEN, to dredge sand in Merrimac River and Plum Island Sound. Granted Sept. 12, 1910.
- ROWE BROTHERS COMPANY, to dredge sand in Ipswich River. Granted Sept. 14, 1910.
- JOSEPH A. McDONALD, to take gravel from the beach opposite F Street, in Hull. Granted Sept. 16, 1910.
- METROPOLITAN CONTRACTING COMPANY, to use temporarily a portion of the Commonwealth flats, at South Boston. Granted Sept. 22, 1910.
- CITY OF BOSTON, to lay a 12-inch water pipe in Fargo Street, between D and E streets, at South Boston. Granted Sept. 23, 1910.
- BOOTH MANUFACTURING COMPANY, to dredge in Acushnet River, at Clark's Point, in New Bedford. Granted Sept. 28, 1910.
- CHARLES T. ALLEN, to remove stone from the beach at Green Hill, in Hull. Granted Oct. 21, 1910.
- F. C. MÜNCH, to take gravel from the beach on Beach Avenue at Bayside, in Hull. Granted Oct. 21, 1910.
- J. P. O'RIORDEN, to dump excavated material on the Commonwealth flats, at South Boston. Granted Nov. 2, 1910.
- BOSTON ELEVATED RAILWAY COMPANY, to dump snow and ice on the Commonwealth flats, at South Boston. Granted Nov. 2, 1910.
- JAMES W. TURNER, to take material from land at Scituate. Granted Nov. 2, 1910.
- J. P. O'RIORDEN, to dredge sand from Cape Cod Bay, between Race Point and Wood End. Granted Nov. 2, 1910.

COLEMAN BROTHERS, to dump excavated material on the Commonwealth flats, at South Boston. Granted Nov. 9, 1910.

QUISSETT MILL, to dredge in Acushnet River, in New Bedford. Granted Nov. 10, 1910.

ESTATE OF ELLEN J. NORWELL, to remove stone near the beach at Egypt, in Scituate. Granted Nov. 14, 1910.

CITY OF BOSTON, to dump on the Commonwealth flats, at South Boston, material taken in the city of Boston, also snow and ice. Granted Nov. 21, 1910.

WORK OF THE UNITED STATES IN RIVERS AND HARBORS OF THE COMMONWEALTH.

The Board is indebted to Col. Frederic V. Abbot, Corps of Engineers, U. S. A., who is in charge of river and harbor improvements in eastern Massachusetts, and Lieut.-Col. J. C. Sanford, Corps of Engineers, U. S. A., who is in charge of similar work in southern Massachusetts, for the following statements, which show the work accomplished in the rivers and harbors of the Commonwealth during the fiscal year ending June 30, 1910:—

STATEMENT OF COL. FREDERIC V. ABBOT, CORPS OF ENGINEERS, U. S. A.

BOSTON, MASS., Nov. 11, 1910.

Board of Harbor and Land Commissioners, Commonwealth of Massachusetts, State House, Boston, Mass.

SIRS:—In accordance with your request of the 9th instant, I have the honor to furnish the following summary of work accomplished by the United States during the fiscal year ending June 30, 1910, upon the improvement of rivers and harbors in Massachusetts under the charge of this office:

Newburyport Harbor.

A breach which had been made by the action of the elements in the dike closing Plum Island basin was cleared of débris, to permit the passage of small boats into the basin, and a survey was made of the bar and entrance channel to the harbor.

Merrimac River.

The removal of boulders in the improved channel below Rocks bridge, which was commenced just prior to the close of the last fiscal year, was completed, a total of 255 cubic yards of boulders being removed from the channel.

Essex River.

The dredging of this river, which was in progress at the close of the last fiscal year, was continued, a total of 15,904 cubic yards being dredged and 30.187 cubic yards of boulders removed from the improved channel, which, including the work done during the previous fiscal year, was redredged to the width of 60 feet and depth of 4 feet at mean low water, for a length of 3,300 feet below the highway bridge at Essex and for about 1,000 feet through the bar at the lower end of the river near Bull Island. At three other points, at difficult curves in the channel, it was deepened to 4 feet and increased to such widths as the money available would permit.

Harbor of Refuge, Sandy Bay, Cape Ann.

The building of the superstructure, of which 97 linear feet were completed during the previous fiscal year, was continued, extending 67.6 feet in a northerly direction toward the junction with the western arm of the breakwater.

Beverly Harbor.

The removal of four ledges, which obstructed the width of the channel near Bar Beacon and at three other points, was accomplished, completing the project for this improvement.

Malden River.

Twenty-one thousand, three hundred and thirty-one cubic yards of material were dredged from the river, restoring to the depth of 12 feet at mean high water the following sections of the channel: for 700 feet above the bridge on Revere Beach Parkway to a width of 100 feet; and for a further distance of 250 feet 75 feet wide and for 200 feet 50 feet wide, opposite the wharf of the Massachusetts Steel Casting Company. The upper section of the channel, at Sand Point, for a distance of 700 feet was dredged 100 feet wide and for a further distance of 200 feet 75 feet wide.

Mystic River Below the Mouth of Island End River.

From the 25-foot channel below Chelsea Bridge 24,942 cubic yards of material were removed, in conjunction with dredging the 35-foot channel of Boston harbor.

Boston Harbor, Thirty-five-Foot Channel.

The dredging accomplished during the fiscal year, as well as the dredging under this project to June 30, 1910, is shown in the following table:—

	WORK DONE IN FISCAL YEAR 1910.				ALL WORK DONE TO JUNE 30, 1910.		
	DREDGING.		BOULDERS.		Dredging (Cubic Yards).	Boulders (Cubic Yards).	Remarks.
	Cubic Yards.	Price (Cents).	Cubic Yards.	Price (Dol- lars).			
Division 1, Section 1, .	39,537	20.0	—	—	1,948,931	—	
Division 1, Section 1a, .	28,401	39.0	—	—	611,453	—	Completed.
Division 2, Section 2, .	—	23.4	—	—	1,898,880	11.310	Completed.
Division 2, Section 2a, .	75,172	40.0	—	—	574,845	—	
Division 3, Section 3, .	3,018	23.5	—	—	1,694,144	—	
Division 3, Section 3a, .	4,444	39.0	27.510	25	449,870	83.888	
Division 4, Section 4, .	—	23.9	—	—	1,878,636	7.332	Completed.
Division 4, Section 4a, .	1,454	39.7	—	—	455,362	31.870	
Division 5, Section 5, .	823,447	22.0	—	—	1,553,275	—	
Division 5, Section 5a, .	240,608	40.0	—	—	572,061	—	
Division 6, Section 6, .	1,080,100	22.0	—	—	2,098,590	—	
Division 6, Section 6a, .	354,662	40.0	—	—	523,120	—	
Division 7, Section 7, .	807,635	22.0	5.000	24	1,969,795	5.000	
Division 7, Section 7a, .	227,748	40.0	—	—	404,706	—	
Division 8, Section 8, .	128,471	22.0	—	—	517,398	—	
Division 8, Section 8a, .	353,342	40.0	9.505	24	485,003	9.505	
Total,	4,168,039	—	42.015	—	17,636,099	148.905	

NOTE. — Sections 1-8 are above President Roads; sections 1a-8a are in Broad Sound.

Under a contract for excavating nine groups of ledges, amounting to 15,195 cubic yards, situ measurement, the three groups remaining at the beginning of the fiscal year, aggregating 3,010 cubic yards, situ measurement, were removed. Under another contract, eleven small ledge points, projecting above the plane of 35 feet below mean low water and containing 5.26 cubic yards, were also removed.

Fort Point Channel.

The dredging to full channel dimensions of the site of the old Mount Washington Avenue bridge, which was in progress at the close of the previous fiscal year, was finished.

Dorchester Bay and Neponset River.

Two hundred and two thousand, one hundred and seventeen cubic yards of material were dredged, completing the project for this improvement, which now has a channel 100 feet wide and 15 feet deep at mean low water from Commercial Point to the Neponset highway bridge, and 18 feet deep and 175 feet wide from Dorchester Bay and the mouth of the river to Commercial Point.

Plymouth Harbor.

The riprap dike on Long Beach was extended northerly 616 linear feet, 2,499 tons of rubblestone being used in the work.

Removal of Wrecks.

The wreck of the fishing schooner "Louise C. Cabral" was removed from Provincetown harbor. A contract for the removal of the wreck of barge "City of Montreal," which sank in Plymouth harbor with about 1,300 tons of stone aboard, about Nov. 26, 1909, was let, and the work of removal was in progress at the close of the fiscal year.

Very respectfully,

FREDERIC V. ABBOT,
Colonel, Corps of Engineers.

Statement of Lieut.-Col. J. C. Sanford, Corps' of Engineers, U. S. A., showing the work done by the United States on the rivers and harbors of Massachusetts under the Newport, R. I., engineer office, during the fiscal year ending June 30, 1910:—

Hyannis Harbor.

No works of improvement were in progress during the fiscal year. A survey of the dredged area was made in June, 1910, which shows that some deterioration in the depth of the harbor has occurred along the southerly and westerly sides of the area protected by the break-water.

Nantucket Harbor.

Maintenance work only has been in progress during the fiscal year. The U. S. dredge "Gedney" worked on the outside of the outer bar of the entrance channel between Sept. 20 and Nov. 30, 1909, as often as the weather would permit, removing 32,874 cubic yards of sand. There is a minimum depth of 9.8 feet at mean low water in the channel depth over the bar.

Vineyard Haven.

No works of improvement were in progress during the fiscal year.

Woods Hole Channel.

No works of improvement were in progress during the fiscal year. Careful sweeping of the channel is in progress, with a view to locating any shoal spots that may remain.

New Bedford Harbor.

The work of dredging, under the continuing contract with the Coast-wise Dredging Company, in progress at the close of the last fiscal year, was completed July 15, 1909. The total excavation was 2,004,679

cubic yards of mud, sand, clay and gravel and 515.83 cubic yards of boulders exceeding 1 cubic yard each. During the progress of this work an area of ledge rock was discovered within the projected lines of the improvement near the north end of Palmer Island. The shoalest sounding on the rock is 15.5 feet at mean low water. The U. S. dredge "Gedney" operated on maintenance work during a portion of December and January, removing 17,012 cubic yards from the approach channel.

Taunton River.

No works of improvement were in progress during the past fiscal year.

Fall River Harbor.

The work during the past fiscal year has been dredging with the U. S. dredge "Gedney" to maintain the depth of 25 feet at mean low water previously secured in the harbor and approach channel. Between March 3 and June 30, 1910, the amount excavated was 86,046 cubic yards. From April 5 to 27 the dredge was undergoing repairs.

Removal of Wrecks.

The following wrecks were removed so as to no longer form obstructions to navigation:—

Schooner "Jennie French Potter," a five-masted schooner, loaded with coal, sunk on "Half Moon Shoal," the eastern end of "Horse Shoe Shoal," about $1\frac{3}{4}$ miles north-northeast of Cross Rip Light Vessel, Nantucket Sound.

Schooner "Charles J. Willard," loaded with molding sand from the Hudson River, struck the "Sow and Pigs Shoal" near the western end of Vineyard Sound, and sank in from 6 to 8 fathoms of water, $1\frac{3}{8}$ miles southwest by south from Cuttyhunk Lighthouse.

Barge "West Virginia," a four-masted barge, loaded with 2,728 tons of coal, struck on a westerly extension of the northerly part of the "Broken Part of Pollock Rip Shoal," and sank in about 10 fathoms of water, $1\frac{1}{2}$ miles south by east one-half east from Pollock Rip Shoals Light Vessel.

Barge "Shenandoah," a schooner-rigged barge, loaded with 1,400 tons of coal, in collision with the steamer "Powhatan," sank in the Pollock Rip Channel about $1\frac{1}{2}$ miles southeast one-half east from Shovelful Light Vessel.

Schooner "Nettie B. Dobbin," loaded with cement, was wrecked on the north side of Nantucket Island, about 1 mile west by south one-half south from the outer end of the west jetty at the entrance to Nantucket harbor.

The survey of Fall River harbor, with a view to providing an anchorage area of 25 feet depth from Borden Flats Light to Slades Ferry bridge, authorized in the river and harbor act of March 3, 1909, was made, and report thereon with estimate of cost was submitted to

Congress, and an appropriation of \$143,000 for the purpose was made by the river and harbor act of June 25, 1910. A report on the preliminary examination of Nantucket Sound, with a view to the removal of the northerly portion of Stone Horse Shoal and of such portions of Bearses Shoal and Pollock Rip Shoal as may be necessary to secure a straight channel through the shoals, was submitted, reviewed by the Board of Engineers for Rivers and Harbors, pursuant to law, and a survey was ordered. Preparations were made for the survey.

A preliminary examination was authorized by the river and harbor act of June 25, 1910, of the "Harbor of New Bedford and Fairhaven, with a view to extending the channel to Belleville."

APPROPRIATION FOR SURVEY AND IMPROVEMENT OF HARBORS.

By chapter 142 of the Acts of 1910, an appropriation of \$4,000 was made for surveys of harbors and for improving and preserving the same, and for repairing damages occasioned by storms along the coast line or river banks of the Commonwealth.

Expenditures from this appropriation have been made to Dec. 1, 1910, in the localities and to the amounts following, viz.:—

Herring River dike, Wellfleet,	\$580 87
Seituate, repairing sea walls,	2,069 40
	<hr/>
Total,	\$2,650 27

COMMONWEALTH'S FLATS IMPROVEMENT FUND.

The balance in the Commonwealth's flats improvement fund on the first day of December, 1909, was \$1,083,154.90. To this has been added during the year \$37,754.45 from the income of the fund and \$33,410.66 from rents of lands and other sources, making a total of \$1,154,320.01. Of this sum there has been expended during the year \$108,426.82, leaving a balance on Nov. 30, 1910, of \$1,045,893.19. Of this balance, \$934,602.12 has been appropriated for the further improvement of the Commonwealth's flats at South Boston.

HARBOR COMPENSATION FUND.

There was paid into the treasury of the Commonwealth during the year, under chapter 146 of the Acts of 1897 and chapter 96 of the Revised Laws, for tide water displaced by work done

under licenses granted by the Board and for rights and privileges granted in tide waters and great ponds, the sum of \$22,087.35, which was credited to the harbor compensation fund for Boston harbor. The amount in this fund on Nov. 30, 1910, was \$621,458.95; the balance of income from this fund in the treasury on the same date was \$29,886.34; the total income for the year was \$24,179.25. The expenditure for dredging during the year, from the income, was \$11,869.36.

The foregoing report is respectfully submitted.

GEORGE E. SMITH,
SAMUEL M. MANSFIELD,
HEMAN A. HARDING,

Commissioners.

DEC. 1, 1910.

APPENDIX.

APPENDIX A.

APPROPRIATIONS BY THE LEGISLATURE AND EXPENDITURES FOR RIVER AND HARBOR WORK UNDER DIRECTION OF THE HARBOR AND LAND COMMISSIONERS.

Small Harbors. — From 1893 to 1910 inclusive.

LOCALITY.	Character of Work.	Total Appropriation.	Total Expenditure.	Approximate Balance required to complete Contract.
Allens harbor, Harwich, .	Survey, . . .	\$219 50	\$219 50	—
Annisquam River and Lobster Cove.	Dredging, . . .	\$1,881 15 ¹	66,825 23	\$16,400 00
Apponagansett harbor, . .	Stone breakwater, .	40,500 00	40,221 33	—
Barnstable harbor, . . .	Survey, . . .	217 51	217 51	—
Bass River, Beverly, . . .	Dredging, . . .	25,000 00	25,539 81	—
Bass River, Yarmouth, . .	Jetties and dredging, .	47,500 00	47,471 72	—
Bucks Creek, Chatham, . .	Jetty and survey, . .	10,250 00 ²	3,988 02	7,200 00
Cataumet harbor,	Survey,	500 00	356 33	—
Centreville River, Barnstable,	Dredging,	5,900 00 ³	2,294 70	5,300 00
Chatham,	Stone riprap, . . .	15,000 00	14,968 75	—
Cohasset harbor,	Breakwater and dredging.	24,000 00 ⁴	21,191 76	11,300 00
Cotuit harbor,	Dredging,	26,200 00 ⁵	17,126 67	9,000 00
Cuttyhunk harbor,	Jetties and dredging, .	31,000 00 ⁶	30,551 34	6,600 00
Deacon's Pond, Falmouth, . .	Jetties and dredging, .	25,000 00 ⁷	35,007 00	—
Dorchester, easterly shore, .	Dredging,	70,000 00	70,171 31	—
East Bay, Osterville, . . .	Jetties and dredging, .	16,938 39	18,874 58	—
Essex River,	Dredging,	5,000 00	5,000 00	—
Green harbor,	Jetties and dredging, .	90,500 00	76,333 26	—
Harbor View,	Dredging,	10,000 00	146 00	—
Herring River, Harwich, . .	Jetties and dredging, .	20,727 93 ⁸	22,765 08	—
Herring River, Wellfleet, . .	Dike and ditches, . .	10,000 00 ⁹	20,815 29	—
Hingham harbor,	Dredging,	10,175 20 ¹⁰	215 02	12,500 00

¹ Contribution by municipality or others, \$1,500.

² Contribution by municipality or others, \$1,000.

³ Contribution by municipality or others, \$1,500.

⁴ Contribution by municipality or others, \$12,000.

⁵ Contribution by municipality or others, \$2,000.

⁶ Contribution by municipality or others, \$5,000.

⁷ Contribution by municipality or others, \$10,000.

⁸ Contribution by municipality or others, \$2,000.

⁹ Contribution by municipality or others, \$10,000.

¹⁰ Contribution by municipality or others, \$3,000.

Small Harbors, etc. — Continued.

LOCALITY.	Character of Work.	Total Appropriation.	Total Expenditure.	Approximate Balance required to complete Contract.
Humarock Beach, Scituate, .	Survey, . . .	\$250 00	\$236 07	—
Improvement of rivers and harbors.	Advertising, . . .	46 62	46 62	—
Ipswich River, . . .	Dredging, . . .	11,201 75	11,390 31	—
Island End River, . . .	Survey, . . .	264 10	264 10	—
Jeffries Point, . . .	Dredging, . . .	10,000 00	—	—
Lake Anthony, Oak Bluffs, .	Jetties and dredging, .	35,208 31	36,393 15	—
Lewis Bay, Hyannis, . . .	Dredging, . . .	16,477 21	17,012 22	—
Lynn harbor, . . .	Dredging and survey, .	12,843 27 ¹	12,788 05	—
Manchester harbor, . . .	Dredging, . . .	8,000 00 ²	8,128 58	—
Menamsha Inlet, . . .	Jetties and dredging, .	54,997 08 ³	57,370 38	—
Merrimac River, . . .	Investigation, . . .	100 00	—	—
Nantucket harbor, . . .	Dredging, . . .	15,000 00	15,980 30	—
Neponset River, . . .	Dredging, . . .	34,270 44	34,269 70	—
North River, Scituate, . . .	Survey, . . .	119 70	552 47	—
Oak Bluffs, public landing, .	Removing rocks, . . .	500 00	462 50	—
Orient Heights, . . .	Dredging, . . .	8,500 00	8,144 52	—
Paskamansett River, . . .	Dredging, . . .	2,095 20	2,187 35	—
Penikese Island, . . .	Pile wharf and survey, .	5,300 00	5,192 95	—
Plum Island River, . . .	Survey, . . .	983 31	983 31	—
Plymouth harbor, . . .	Dredging, . . .	80,400 00 ⁴	111,374 68	\$29,000 00
Province Lands, . . .	Reclamation, . . .	58,000 00	52,694 93	—
Quansett harbor, Orleans, .	Survey, . . .	195 88	194 50	—
Quicks Hole, . . .	Survey, . . .	500 00	—	—
Revere, . . .	Stone breakwater, . .	55,000 00	54,990 84	—
Rock Harbor, Orleans, . . .	Dredging, . . .	5,200 00	5,196 06	—
Rockport harbor, . . .	Removing rocks, . . .	8,000 00	7,319 70	—
Saugus River, . . .	Survey, . . .	1,000 00	638 53	—
Scituate, . . .	Sea walls and riprap, .	38,300 00	39,318 66	302 55
Seorton harbor, Sandwich, .	Jetty and dredging, . .	15,051 35	12,968 00	—
Sesuit harbor, Dennis, . . .	Jetty, . . .	19,426 10 ⁵	20,466 30	—
Shirley Gut, . . .	Dredging, . . .	—	1,906 20	—
Sippican harbor, Marion, . .	Survey, . . .	7 17	7 17	—

¹ Contribution by municipality or others, \$200.² Contribution by municipality or others, \$2,500.³ Contribution by municipality or others, \$700.⁴ Contribution by municipality or others, one-half cost by town of Plymouth.⁵ Contribution by municipality or others, \$1,000.

Small Harbors, etc. — Concluded.

LOCALITY.	Character of Work.	Total Appropriation.	Total Expenditure.	Approximate Balance required to complete Contract.
Southerly shore of South Boston.	Dredging,	\$108,222 04	\$100,526 27	\$27,500 00
South River, Salem, . . .	Dredging,	5,000 00 ¹	8,097 67	-
Stage harbor, Chatham, . .	Dikes,	6,000 00	9,231 93	-
Stony Beach, Hull,	Sea wall,	11,607 90	11,335 07	-
Taunton River, Dighton, . .	Survey,	298 12	298 12	-
Taunton River, Boston harbor canal.	Survey,	10,000 00	9,932 75	-
Vineyard Haven harbor, . .	Stone breakwater, . .	30,500 00	30,231 86	-
Waquoit Bay,	Survey,	1,000 00	701 61	-
West Bay, Osterville, . . .	Jetties and dredging, . .	33,500 00	39,507 02	-
West Falmouth harbor, . . .	Dredging,	25,500 00	23,379 47	-
Weymouth Fore River, . . .	Dredging,	37,500 00 ²	24,066 70	-
Wild harbor, Falmouth, . . .	Breakwater,	5,157 14	100 27	-
Winthrop harbor channel, . .	Dredging,	5,000 00	9,203 37	-
Winthrop harbor, Cottage Park.	Dredging,	6,525 00	6,581 66	-
Witchmere harbor, Harwich, .	Jetties and dredging, . .	17,288 04 ³	22,622 02	700 00
Wollaston Beach, Quincy, . .	Dredging,	15,000 00	14,644 61	-
Wrecks,	Removal from tide water.	58,416 66	6,948 78	-
Totals, . . . .	. . . .	\$1,440,262 07	\$1,356,137 54	\$125,802 55

Boston Main Harbor. — From 1870 to 1910 inclusive.

Anchorage basin,	Dredging,	\$1,002,500 00	\$504,268 50	-
Boston harbor,	Dredging,	165,000 00 ⁴	527,222 41	\$10,500 00
Commonwealth's flats at East Boston.	Harbor improvement, . .	3,106,000 00	35,084 27	-
Commonwealth's flats at South Boston.	Harbor improvement, . .	4,838,902 03	3,208,306 64	775,000 00
Commonwealth Pier,	Wharf and dock,	400,000 00	381,877 09	-
Dry dock,	Investigation,	5,000 00	435 50	-
Metropolitan dock system, . .	Investigation,	1,000 00	644 15	-
Northern Avenue,	Bridge,	260,000 00	260,000 00	-
South Bay improvement fund, .	Dredging,	59,437 50	57,341 24	-
Totals, . . . .	. . . .	\$9,831,839 53	\$4,975,179 80	\$785,500 00

¹ Contribution by municipality or others, \$3,000.² From small items, \$1.15.³ Contribution from municipality or others, \$500; from small items, \$3.64.⁴ In addition, \$364,218.91 from income of harbor compensation fund.

Connecticut River. — From 1888 to 1910 inclusive.

LOCALITY.	Character of Work.	Total Appropriation.	Total Expenditure.	Approximate Balance required to complete Contract.
Agawam,	Bank protection, . . .	\$13,000 00	\$11,430 19	—
Hadley,	Bank protection, . . .	75,484 82 ¹	77,822 44	\$979 10
Hatfield,	Dikes,	7,500 00	6,700 75	—
Holyoke,	Dredging,	15,000 00	—	—
Investigation of navigation, .	— — —	5,500 00	2,788 01	—
Northampton,	Bank protection, . . .	1,500 00	1,524 20	—
West Springfield,	Bank protection, . . .	5,000 00	5,051 49	—
Totals, . . . . .	. . . . .	\$122,984 82	\$105,317 08	\$979 10

Summary.

Small harbors, 1893 to 1910, .	— — —	\$1,440,262 07	\$1,356,137 54	\$125,802 55
Boston main harbor, 1870 to 1910.	— — —	9,831,839 53	4,975,179 80	785,500 00
Connecticut River, 1888 to 1910.	— — —	122,984 82	105,317 08	979 10
Totals, . . . . .	. . . . .	\$11,395,086 42	\$6,436,634 42	\$912,281 65

¹ Contribution by municipality or others, \$500.

APPENDIX B.

[See page 4 of this report, *ante*.]

CONTRACTS MADE AND PENDING DURING THE YEAR 1910.

Contract No.	Work.	Contractors.	Date.	To be completed.	Condition of Work.	Prices.	Amount.
84	Dike at Herring River, Wellfleet, .	Thomas & Connor, .	Apr. 24, 1908	Aug. 1, 1908	Completed,	\$16,250,	\$16,332 03
91	Dredging at West Falmouth, .	John H. Gerrish, . .	Aug. 14, 1908	Dec. 31, 1908	Completed,	38 cents per cubic yard, scow measure.	9,208 30
92	Dredging in Plymouth harbor, .	Eastern Dredging Co., .	Sept. 4, 1908	Oct. 1, 1910	In progress,	Dredging, 16.7 cents per cubic yard, scow measure; dol- lums, \$120 each.	135,000 00
101	Dredging channel, Orient Heights, .	J. P. O'Riordan, . .	July 14, 1909	Dec. 31, 1909	Completed,	24½ cents per cubic yard, scow measure.	7,797 07
102	Riprap, Bass River, Yarmouth, .	Connolly Bros., . .	July 14, 1909	Dec. 1, 1909	Completed,	\$2.30 per ton,	9,016 00
103	Riprap at Chatham,	Wm. Sears, D. A. Eldridge & Charles H. Taylor.	Aug. 6, 1909	Oct. 1, 1909	Completed,	Quarry grout, \$2.60 per ton, chips or field stone, \$2.60 per ton.	14,383 20
104	Stone jetty and breakwater, Vineyard Haven harbor.	E. S. Belden & Sons, . .	Aug. 6, 1909	Nov. 1, 1909	Completed,	Stone in breakwater, \$1.23 per ton. Clamps, \$5 each. Stone in jetty, \$1.53 per ton.	9,540 17
106	Dredging channel and anchorage basin, West Falmouth.	John H. Gerrish, . . .	July 2, 1909	June 1, 1910	Completed,	Entrance channel, 38 cents per cubic yard. Anchorage basin, 30 cents per cubic yard.	8,511 42
109	Oak pile wharf on Reserved Channel, South Boston flats.	L. Robert Tidd Co., . .	Oct. 8, 1909	Jan. 31, 1910	Completed,	\$10,101,	10,101 00
110	Dredging at Commonwealth pier, South Boston.	Eastern Dredging Co., . .	Oct. 22, 1909	May 31, 1911	In progress,	15.3 cents per cubic yard, measured in scows.	71,000 00

CONTRACTS MADE AND PENDING, ETC. — Concluded.

Contract No.	Work.	Contractors.	Date.	To be completed.	Condition of Work.	Prices.	Amount.
112	Extending stone jetties at Herring River.	William Sears & David A. Eldridge.	Nov. 26, 1909	Sept. 1, 1910	Completed,	\$2.60 per ton,	\$9,371 53
113	Dredging channel at Cuttyhunk, .	John R. Burke,	Dec. 10, 1909	June 1, 1910	In progress,	\$15,600,	15,600 00
111	Dredging anchorage basin in Lynn harbor.	John H. Gerrish,	Dec. 14, 1909	May 28, 1910	Completed,	17½ cents per cubic yard, scow measure.	11,027 48
114	Dredging upper portion of Neponset River.	Charles M. Cole,	Apr. 1, 1910	Nov. 1, 1910	Completed,	29½ cents per cubic yard, scow measure.	33,335 51
116	Extending stone jetty at Sesuit harbor.	John Cashman & Sons Co., .	Apr. 29, 1910	Sept. 1, 1910	Completed,	\$1.73 per ton,	9,797 96
115	Dredging upper portion of Weymouth Fore River.	J. P. O'Riorden,	May 11, 1910	Aug. 1, 1910	Completed,	29¼ cents per cubic yard, scow measure.	9,784 18
118	Improving mouth of Bucks Creek, South Chatham.	James H. Connolly,	May 20, 1910	Oct. 1, 1910	In progress,	Excavating channel and building earth portion of dike, \$2,600. Stone in jetties and riprap, \$2.35 per ton.	8,710 00
119	Improving Menamsha Inlet, .	Eastern Dredging Co., . . .	June 3, 1910	Nov. 1, 1910	Completed,	Dredging, building earth portion of training wall and disposing of surplus material, \$5,790. Stone in jetties and riprap, \$2.15 per ton.	11,139 73
122	Dredging South Channel of Mystic River.	Eastern Dredging Co., . . .	July 1, 1910	Aug. 1, 1911	In progress,	14½ cents per cubic yard scow measure.	14,700 00
123	Dredging anchorage basin and channel, Cohasset harbor.	J. P. O'Riorden,	July 18, 1910	Aug. 1, 1911	In progress,	14½ cents per cubic yard, scow measure.	20,800 00
124	Stone breakwater at Cohasset harbor.	Thomas Fitzgibbon,	July 18, 1910	Oct. 30, 1910	In progress,	\$2.13 per ton,	8,520 00
121	Dredging channel at Cotuit harbor, in Barnstable.	Bay State Dredging Co., . .	July 25, 1910	Dec. 1, 1911	In progress,	\$22,500,	22,500 00
126½	Riprap, Connecticut River, Hadley, .	Florus W. Carrier,	Aug. 16, 1910	-	In progress,	\$2.25 per ton,	7,620 00
126	Repairing sea walls, North Scituate Beach.	William H. Connor,	Sept. 2, 1910	Nov. 1, 1910	In progress,	\$5.95 per cubic yard of concrete measured in place.	20,241 00
125	Pier No. 6 and Northern Avenue extension.	Holbrook, Cabot & Rollins Corpn.	Sept. 23, 1910	Jan. 1, 1913	In progress,	\$760,000,	760,000 00

127	Dredging channel and anchorage basin in Hingham harbor.	Charles M. Cole, . . .	Sept. 28, 1910	June 1, 1911	In progress,	26½ cents per cubic yard, scow measure.	12,500 00
128	Dredging channel in Centreville River, Barnstable.	John H. Gerrish, . . .	Sept. 28, 1910	Dec. 1, 1910	In progress,	\$7,200,	7,200 00
129	Widening South Channel of Mystic River.	Bay State Dredging Co., . .	Nov. 18, 1910	Aug. 1, 1911	-	18 cents per cubic yard, scow measure.	7,740 00
130	Dredging at Lobster Cove, Annisquam, Gloucester.	J. P. O'Riorden, . . .	Nov. 18, 1910	July 1, 1911	-	22½¢ cents per cubic yard, scow measure.	16,000 00
131	Dredging near Mosquito Fleet Yacht Club House, South Boston.	Eastern Dredging Co., . .	Nov. 18, 1910	Dec. 1, 1911	-	Excavating the anchorage basin near the Mosquito Fleet Yacht Club House, 21½¢ cents per cubic yard, scow measure. Excavating the entrance channel, 28½¢ cents per cubic yard, scow measure.	27,200 00

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